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# The vermin -killers: Pest control in the early Chesapeake

Megan Haley Newman
*College of William & Mary - Arts & Sciences*

# THE VERMIN-KILLERS:
# PEST CONTROL IN THE EARLY CHESAPEAKE

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In Partial Fulfillment

Of the Requirements for the Degree of

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by

Megan Haley Newman

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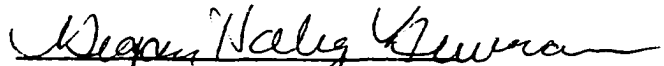

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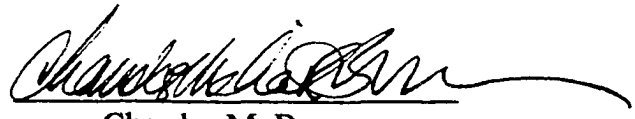

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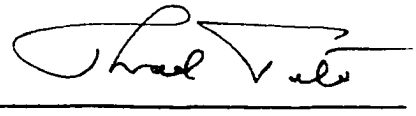
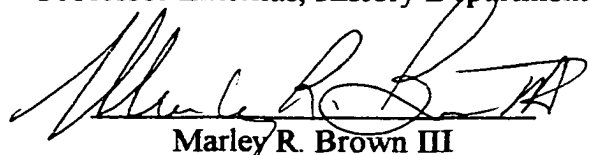


Thad Tate
Professor Emeritus, History Department



Marley R. Brown III
Lecturer, History Department and
Director, Archaeology Department, The Colonial Williamsburg Foundation

Margaretta M. Lovell
Associate Professor, Department of History of Art
University of California, Berkeley

Michael Jarvis
Assistant Professor, History Department and
Postdoctoral Fellow, Omohundro Institute of Early American History and Culture

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## LIST OF ILLUSTRATIONS

## ABSTRACT

The presence of pests and the effect of their activity emerged very early in the colonial era, from the early seventeenth century through the third quarter of the eighteenth century, as a major challenge to the financial and social success of Euro-American settlers, predominantly English, in the tidewater region of Virginia and Maryland, or the Chesapeake. Pests were not only a feature of the natural environment, they were a factor in the modified and built environments that settlers created. The problem of pests cut across ethnic, race, gender and class lines in the Chesapeake.

Euro-American, African-American and Native American residents of the colonial Chesapeake consistently characterized pests as not simply annoying, but as also as threats. Their responses to pests reflected notions about both the nature of the threat pests presented, and the commodities and resources that residents valued. Pest control schemes were based on the establishment and reinforcement of boundaries across which pests and their effects were not tolerated. These boundaries quickly assumed a social function. In addition to defining an area in which the presence and activity of pests was restricted, these boundaries functioned as thresholds across which human interaction had to be negotiated. Pest control assumed boundary maintenance functions on several levels.

In different times, places and circumstances, the role of vermin killer fell to different people in Euro-American traditions. In the domestic sphere the responsibility for managing pests in the home fell to women. In connection to their role in pest control, women had an important role in managing the establishment, reinforcement and maintenance of physical and social boundaries in the home.

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# INTRODUCTION

European settlers in the New World were confronted with a wide range of new opportunities and challenges. Many people in the tidewater area of Virginia and Maryland, the Chesapeake region, sought to profit from the exploitation of indigenous and introduced natural resources. The natural and cultural environment of the region had a significant impact on the viability of this goal. While many features of the environment were not entirely new to Euro-American settlers in the area, differences in weather, and flora and fauna, as well as their expectations for the region contributed to a perception of the Chesapeake region as Eden. It was viewed as a garden that had the potential to produce staggering wealth. In reality, it was an economy, an environment, and a society in flux. Substantial opportunities and risks existed for all those involved. Settlers quickly realized that rather than simply gathering a ready-made harvest, management of the environment would be the key to their success. It became enormously important for the settlers, investors in the colonial project, and political administrators to understand the environment, the threats it posed to their mutual objectives, and the best ways to mitigate these threats.

This study will demonstrate that pests' presence and the effects of their activity emerged very early as a major challenge to financial and social success for Euro-American settlers, predominantly English, in the colonial-era Chesapeake. The colonial era in this

region extends over almost two hundred years, from the early seventeenth century through the late eighteenth, and significant changes occurred over this time. For all practical purposes, however, there were few major technological changes in the development and implementation of pest control practices during this period, which allows for a holistic treatment of the era as far as pest control is concerned. Significant changes in ideas about the roles and responsibilities of women in American homes developed in the post-colonial era. These ideas placed a new emphasis on domesticity, cleanliness and managing the household environment and family.[1] Coupled with advances in science and technology that produced new methods of pest control, these changing views of women and the home, as well as the goals the newly independent nation country was developing makes the end of the colonial era the appropriate end to the time frame under consideration in this study.

A number of factors certainly affected development in the Chesapeake, but pests and pest control played an important part in the process. Pests were not only a feature of the natural environment; they were a factor of the modified natural and built environments that settlers created. In fact, the very definition of a creature, typically an insect or small mammal, as a pest presumes an adverse impact on people and the "environments" they constructed.

The pest control practices that Euro-Americans, Native Americans, and African Americans developed in the colonial Chesapeake emerged out of a concern for the health of the community in response to socially conceived threats. These threats included the compromised material, social, and physical well-being that damaged goods, spoiled food, weakened structures, and unsightly appearances produced through pest activity. An even

more significant threat pests posed to settlers was the risk that settlement or the colonial venture might founder due to failed crops or pest-borne illnesses, and the destabilized social structure they would engender.

The problem of pests and pest control cut across economic, gender and racial lines. In that regard, problems with pests were a common denominator, or an element of shared experience among all residents of the Chesapeake. However, different standards, tolerances and responses were in effect in different circumstances. Furthermore, while practices were similar, the motives for regulating pests varied enormously within and across racial and social groups. Although the impact of pests was felt among all members of the community, individuals and groups had varying roles and responsibilities for addressing the situation. In the Euro-American domestic sphere, the responsibility for preventing and eliminating pests fell to women. A failure to do so on their part compromised their identity as successful or "good" women.

Scholars should view facets of the pest perception and control phenomenon in reference to one another in order to better understand both. The identification and response to pests and conditions conducive to pests is an integrated phenomenon. Pest control was an economic issue, tied into matters of health and hygiene, closely connected to appearances, and linked to a social structure in which the success of the individual depended in part on the cooperation of others. Despite settlers' limited understanding of pests as vectors of disease, they recognized that the two were linked and that conditions conducive to pests also perpetuated illness. As a result, notions of pests and disease were often conflated.

Since pest control is such a multi-dimensional phenomenon, historians can most productively study pests and pest control practices in the early Chesapeake from an interdisciplinary perspective. This analysis considers pest control from the perspectives of history, anthropology, archaeology, economics, and to a lesser degree, language studies and the history of medicine and technology. The project draws heavily on manuscript, literary, art history, and some archaeological sources for data. Personal papers and prescriptive literature were especially rich resources.

Many of these sources that reference pest control, especially prescriptive literature, were authored by men and geared towards a literate audience. They provided information about a set of vernacular customs practiced largely by illiterate women imbedded in an oral culture. The texts preserved and perpetuated practices on this era that may otherwise have survived only by memory. However, these practices have been filtered through the lens of the men's experiences and objectives for their publications. Some compilers acknowledged the incongruity inherent in books produced by men about traditionally female skills. They recognized that their authority in this area could be challenged, and that they crossed a gender boundary by espousing feminine practices. In an effort to simultaneously assert the legitimacy of the information they presented and distance themselves from women's work, some authors and printers maintained that they were simply sharing data collected from women. For example, the 1683 edition of Gervase Markham's 1615 *The English Huswife*, included the following note,

> "Thou mayest say (gentle Reader) what hath this man to doe with Hus-wifery, he is now out of his element. I shall desire thee therefore to understand, that this is no collection of his whose name is prefixed to this work, but an approved Manuscript which he happily lit on, belonging sometime to an honorable Personage of this kingdome, who

was singular amongst those of her ranke for many of the qualities here set forth. This onely he hath done, digested the things of this book in a good method, placing everything of the same kinde together, so as to make it common for thy delight and profit."[2]

As one reflection of women's pest control practices these texts provide valuable insight into the pest control phenomenon. Nonetheless, claims that the information they contain represents women's actions and captures an oral tradition must be considered carefully in a study of this nature.

This study operates on the premise that elements of the natural environment contribute to the development of elements of the cultural environment according to the needs and goals of the society in question. These needs may be physical, like the necessity for adequate food and shelter to survive, or existential, like the necessity for a shared belief system or social structure for a culture group to function. The need to identify and regulate pests in the Chesapeake was linked to both settlers' physical and cultural survival.

White, black and Native-American residents of the colonial Chesapeake consistently characterized pests as not simply annoying, but also as threats. Pest control schemes were based on the establishment and reinforcement of boundaries across which pests and their effects were not tolerated. Among people in the Chesapeake, these boundaries quickly assumed a social function. In addition to defining an area in which the presence and activity of pests was restricted, these boundaries functioned as thresholds across which human interaction had to be negotiated. In effect, pest control became part of a boundary maintenance system on many different levels. Boundary maintenance has been considered by anthropologists like Mary Douglas as a way of keeping systems "pure" and by scholars of ethnicity like Werner Sollors as a way of bonding societies together.[3] In

this study the term boundary maintenance is used to represent the acts that, through specific choices of inclusion and exclusion, reflect a group's or an individual's ideas about threat, risk, protection and success. This complicated the responsibilities of women in the home for regulating pests.

Most existing scholarship of pests and pest control is in the field of economic entomology and biology. Economic entomology examines the question of pest control from the perspective of managing the costs, financial and otherwise, of control strategies to society. It considers, for example, the balance between increased crop production and health risks to farm workers that using certain pesticides creates.[4] In the field of biology, authors have linked descriptions of animals identified as pests, like rats, mice, lice, or wolves, with discussions of how to control them. Whereas they tended to focus on the physical traits, behaviors, and habitats of animals not considered pests. On occasion, these works included a discussion of the advantages of a given creature to humankind, generally in the form of some resource, like meat, skins, or pharmaceutical uses of the animals' body parts and products.[5] Some authors noticed the discrepancy between descriptions of pests and other animals. One seventeenth-century author, the naturalist Edward Topsel, claimed that creatures considered pests were not generally or historically considered profitable, and as a result had been categorized and described in different ways from other creatures. Topsel then suggested that all of God's creatures had some purpose, even if it had not yet been identified, or if it was simply to punish men or give them cause for reflection.[6]

Later English authors, like Edward Butler, the nineteenth-century author of Our Household Insects: An Account of the Insect Pests Found in Dwelling Houses,

perpetuated a longstanding practice when he urged readers to consider the worth of insects and pests as both a reflection of the wonders of God's creation, and an inexpensive and readily accessible subject for the study of natural history and science.[7] Despite these apparent advantages, authors persisted in characterizing insect pests with derogatory language not found in descriptions of other insects, and they continued to include control strategies with their descriptions.[8] By the late twentieth century, some authors like James R. Busvine and David G. Gordon demonstrated an impulse to educate Americans about insects, natural history, and the environment by taking advantage of the context in which many Americans are most likely to encounter and remember insects: the home.[9]

The impact that pests and pest-borne diseases have had on human history has been considered in a number of studies. The goal of these projects was to impress upon the reader the role that elements of the natural environment, or imagined natural environment, can have on political, military or historical events.

George Ordish authored many works that examined humans' interaction with the natural environment. His works tended to be descriptive narratives organized around cycles of life and circles of interaction between life forms.[10] He distilled this relationship down to a constant competition for resources.[11] Ordish focused on the practical and physical aspects of this competition without much consideration of the conceptual or cultural aspects. In his work, Ordish is very successful in establishing evidence of long-term trends in human and animal interaction.[12] However, his evidence for cultural responses to pests over time prioritized written and printed sources and discredited or dismissed local and oral traditions.[13] In addition, some of the scenarios he depicted did

little to establish facts and much to perpetuate racial, social, and cultural stereotypes. For example, he constructed scenarios in which members of lower economic classes and minority groups were characterized as having poor hygiene, lesser standards of cleanliness, and were responsible for introducing especially pernicious pests into the homes of middle-class white families.[14]

Several other scholars worked to demonstrate the impact of insects and pests on human history. In 1935, Hans Zinnser, author of Rats, Lice and History, was one of the first to use this approach. Zinnser focused on the role of rats in the transmission of typhus throughout history, and, more importantly, on the impact of typhus on the course of human events. Studies like J.L. Cloudsley-Thompson's Insects and History,[15] James R. Busvine's Insects, Hygiene and History, and Insects and Hygiene: The Biology and Control of Insect Pests of Medical and Domestic Importance, and May R. Berenbaum's Bugs in the System: Insects and Their Impact on Human Affairs continued in the spirit of Zinnser's work. All of these scholars strove to document the link between the human condition and insects. This study will expand on their and others' work by emphasizing pest control in particular, including an analysis of social responsibility towards pest control, and examining the question of boundary maintenance as it relates to pest control and social structure.

Robert Hendrickson and Robert Snetsinger focused specifically on rats in their work. In More Cunning than Man: A Social History of Rats and Men, Hendrickson wanted to educate and reform attitudes towards rats while highlighting the real risks with which they are associated. He tracked the rise of professional ratcatchers in Europe and

described several strategies for eliminating rats.[16] Snetsinger focused even more specifically on professional extermination as one of the health-related professions in The Ratcatcher's Child: The History of the Pest Control Industry.[17] Snetsinger provided a general chronology of the industry and he emphasized the importance of understanding the perceived threat pests present in order to best respond to the problem.[18] This study will fill gaps in Snetsinger's work about the colonial era Chesapeake, vernacular or household practices, and the impact or implications of pest control.

A recent article by Donald Linebaugh in the Winterthur Portfolio offered an environmentally based explanation for the development of service outbuildings on plantations in the colonial era Chesapeake.[19] He found that the use of separate outbuildings improved food storage conditions while simultaneously removing unpleasant smells, mess, heat and pests from the house. The appeal of the resulting building layout was reinforced by the increasing desire for privacy, gendered spheres, and racial and social separation on southern plantations. Linebaugh drew a connection between a need created by environmental conditions and the response rooted in physical practicality and the existing social structure.

In addition to the impact of pests on human history and social structures, another important component of this study is a consideration of women's responsibility for pest control in the domestic sphere. The subject of women and domestic economy became increasingly popular among scholars in the 1980s. A number of authors focused their attention on the role of women in the household, and the connection of these roles to broader issues in the social and economic history of the United States. Among these

studies were Faye E. Didden's Serving Women, which examined pre-Civil War domestic paid service, and Laurel Thatcher Ulrich's Good Wives and Joan M. Jensen's Loosening the Bonds which examined the importance of household labor for larger social and economic systems. In addition, Susan Strasser's Never Done, Ruth Schwartz Cowan's More Work For Mother, Annegret S. Ogden's The Great American Housewife, and Glenna Mathews' Just A Housewife, all considered housework in the context of increasing industrialization and industrial capitalism, while challenging traditional views of women's unpaid domestic labor, images of the housewife, and the impact of technology on housework.[20] However, none of these works considered pest control in the domestic sphere, the role of women in developing and implementing control strategies, or the role of pest control as a function of boundary maintenance. The curious omission of a discussion of pest control in these studies leaves a gap in the scholarship of the history of domestic economy and household management. One text regarding the technology related to domestic economy in Great Britain briefly mentioned pest control in a photo caption as an important part of food preservation.[21] However, other domestic economy studies do not mention traps or even the practice of pest control itself.

Despite some interest among historians, scientists wrote the majority of contemporary texts that consider the issue of pest control.[22] Scientists' interest and concern tends to have been prompted by the modern crisis with toxic chemical pesticides. A number of these studies, like Rachel Carson's Silent Spring[23] and Harry Rothman's Insect Pest Control Research, [24] examine the social climate that precipitated an uneven development of chemical pest control strategies in preference to biological or ecological

approaches in the twentieth century. Carson suggested that a taboo on discussing pests has diminished because we now know that the remedies for regulating pests can be very dangerous themselves. This creates opportunities to lay blame on manufacturers for creating dangerous chemicals rather than on homemakers and farmers who use them.[25] On some level this taboo may have contributed to the hesitation on the part of historians and scholars of domestic economy to include a consideration of pest control practices in their studies.

This study seeks to contribute to the existing scholarship regarding the social world of the colonial era Chesapeake. It will do so by examining the materials, behaviors, and social structures that supported the development of particular pest control practices in this New World environment. An analysis of these pest control strategies provides insight into several areas of historic interest. First, the importance of these practices goes beyond their role in reducing damage and some health risks. It is also important that such practices increased health risks for some people, like the women responsible for preparing and applying toxic pesticides. Second, these practices reflect tolerance levels for animals construed as threats, and alert the historian to what concerned and motivated people in the past. Third, regulating pest populations became a community ideal and created both standards and obligations on the part of individuals to the larger group in matters of health, hygiene and extermination. Fourth, an analysis of pest control practices reveals a pattern of boundary definition and maintenance that applied to the physical, social and ideological world in the Chesapeake.

Chapter One of this study examines notions of pest and disease in the English

cultural tradition, and the Chesapeake region in particular, during the colonial era. While settlers did not fully understand the connection between conditions conducive to both pests and disease and that some pests served as vectors for disease, they did recognize that the two were related and could have similar effects on people and the economy. Chapter Two outlines the nature of the pest problem in Virginia for settlers, and the specific animals with which they struggled. It begins with an analysis of the expectations settlers had for the region, how these ideas were developed, and how they affected settlers' reactions to the environment, including pests. Chapter Three considers who, historically, in the English cultural tradition has been involved with pest control and was responsible for regulating the appearance and impact of pests. A study of vermin-killers offers insight into cultural attitudes towards pests, pest control, and those responsible for it. Chapter Four examines the role of pest control and boundary maintenance in the colonial era Chesapeake, and highlights the roles that women had in connection to both pest control and boundary maintenance in the home.

# CHAPTER ONE
# NOTIONS OF PEST AND DISEASE

*"Insects nurture and protect us, sicken us, kill us. They bring us both joy and sorrow. They drive us from fear to hate, then to tolerance. At times they bring us upshot to a realization of the way the world really is, and what we have to do to improve it. Their importance to human welfare transcends the grand battles we fight against them to manage them for our own ends. Most of us hate them, but some of us love them. Indeed, at times they even inspire us."*

*John J. McKelvey, Jr. 1975*[1]

The single most important factor for residents of the colonial era Chesapeake when they selected a pest control strategy was how they defined "pest." The problems that pests presented for settlers were often tied up with their identification of something as a "pest." Their definitions took into consideration the nature of the threat the pest presented, and the boundary settlers felt the pest had transgressed. The effects on a community of both pests and disease could be comparable for settlers. In fact, the term pest is linked etymologically to pestilence. Although settlers were not aware of the physical connection between some illnesses and the pests that served as vectors for the transmission of disease, that link was important to the health, success and development of the colony. Settlers' notions of both pest and disease must be considered to understand the cultural and ideological context from which pest control practices, and attendant boundary maintenance schemes, emerged.

Notions of Pest

In general, notions of pests incorporate the human perspective of another organism's proper place, and the population level of the organism. "Pest" is a socially defined term,[2] or a social construct. The presence and action of insects, small mammals or other creatures are viewed within the context of what the culture group in question considers "normal." In the Chesapeake region during the colonial era, the kinds of pests people complained about most often in the domestic sphere were body pests like fleas and lice, biting insects like mosquitoes and ticks, and pantry pests like rats and cockroaches. The agricultural and domestic pests that were mentioned the most often in period sources include wolves, bears, squirrels, foxes, weasels, rats, mice, mosquitoes, roaches, bedbugs, flies, fleas, lice, hornets, bees, wasps, chiggers, ticks, moths, ants, and crows. In surviving period sources there is an unexpected lack of explicit references to and strategies to manage one very common and destructive Chesapeake area pest, the termite. Archaeological evidence, or some, as of yet, unrecovered manuscripts may reveal some insight into the nature of the specific challenges termites presented to settlers, as well as the chemical, mechanical and architectural strategies settlers elected to regulate them. We can, by inference, suppose that the increase in popularity (among those who could afford them) of more permanent buildings was linked in part to the depredations to which impermanent architecture, like post in ground structures, was subjected by termites.

As soon as the animals under consideration begin to appear or behave in ways that are considered unacceptable, they are designated pests. The range of circumstances in which a given creature becomes a pest vary according to the conventions of the culture

group establishing the terms. Nonetheless, there is a cross-cultural core that remains consistent in all definitions of pests. The organisms identified as pests are always, in some way, identified as annoying or injurious to humans. Efforts to identify what should be considered a pest and what criteria should be used to define them are generally found among scientists, not historians. Scientists define pests in terms of the impact they have on a given culture group. This study also considers pests in light of the responses that English authors and colonial-era Chesapeake area residents have had to them.

American attitudes towards animals, including pests, have varied enormously over time. For example, horses have been considered resources to be exploited for their horsepower, as well as objects to be admired and represented in art. Wildlife species native to America have been viewed as physical resources, as well as "national treasures" to be admired and protected.[3] One of the problems in discussing human perceptions of animals is the need to construct categories of analysis that accurately reflect people's perceptions and feelings. It is important for scholars to try to develop an emic understanding of the categories people used, rather than their own etic imposition of categories of analysis. This categorization process is further complicated by the fact that people's attitudes towards animals can change over time and according to the context in which they encounter the animals.[4] This is especially true of pests.

Certainly not all or even most insects are "bad," nor are all insects pests. Some cause significant problems for humans but the proportion of the "bad" ones to the "good" ones is minuscule.[5] Contemporary entomologist Michael T. Peters writes that, "Achievement of pest status for a given species is explained in terms of (1) where the

various species of insects 'fit' in an ecosystem, (2) the artificiality of some ecosystems, and (3) how the 'balance of nature' may work to eliminate potential problems."[6] An animal's diet can affect its designation as a pest species, especially if it competes with humans for food, if the waste products of its diet are offensive to people, or if its eating damages a resource valued by people. Sheer numbers are also a factor in designating something as a pest in a given culture.[7]

Human practices in the Chesapeake often caused or exacerbated pest problems. By storing food in large quantities or growing crops in large fields people created ideal conditions for the breeding and increase of pest populations that otherwise could have existed in relatively small numbers.[8] Inadequate waste disposal, crops, human dwellings, and certain industrial activities, like indigo production, also fostered pest infestations.[9] Pests did not restrict their diets to human food sources. They ate books, clothes, building materials and other things that people valued.[10] The problem was further complicated by the fact that insects are people's worst enemies as far as health matters are concerned.[11] Five of the ten Biblical plagues were insect-related.[12]

Many of the ideas and attitudes people developed about insects and other pests were perpetuated by some of the "educational" materials, like naturalists' surveys of the animal kingdom, or in the eighteenth century, encyclopedias, designed to present an objective view or to allay misconceptions about insects. Negative attitudes have been reinforced by authors who used value-laden language to describe insect and other pests and who heavily anthropomorphized pests or likened their behaviors to undesirable human traits.[13] These negative sentiments were perhaps so popular because of the context in

which humans most often encountered and responded to pests. Residents of the colonial-era Chesapeake region most often encountered pests as competitors for food, fibers, and other natural resources, as well as cultural resources like the appearance of cleanliness, or a demonstration of cultural mastery over the natural world. Disparaging opinions about pests were not new or unique to Euro-American settlers. English cultures have been disparaging pests in the same way for centuries. Endowing insects with human characteristics was also common. This practice was so prevalent that from at least the seventeenth through the twentieth century scientists defended their study of insects as a consideration of the virtues "demonstrated" by insects. For example, the ant demonstrated prudence; the bee, justice; the grasshopper, valor; and the spider, industry.[14]

Pests represented a wide range of species, and people encountered them in a wide range of environments. Many people had trouble rationalizing the utility, attractiveness or potential benefit of pests in any setting. Some people who were beleaguered by pests in Virginia, like a French eighteenth-century diplomat, Michel Guillaume Jean de Crèvecouer, rationalized that pests were not operating out of malice, but merely trying to survive themselves.[15] He tried to understand pests as part of the balance of nature.[16] Colonel Landon Carter of Virginia felt that in some cases toleration was warranted, and that it was wrong for people to try to civilize nature with efforts to regulate and control aspects of it, like insects, for their own purposes.[17]

Other people have attempted to draw some meaning from such a seemingly irrational phenomenon as pests. In the colonial era, Virginian William Byrd determined that, "God was pleased to create these and many other vexatious animals, that men should

exercise their wits and industry to guard themselves against them."[18] One English seventeenth-century naturalist, Thomas Mouffet believed that insects were "procreated either to be useful in physik, or for delight of the eyes, the pleasure of the ears, or the compleating and ornament of the body."[19] Mouffet also advanced his belief that insects played a role in persuading nonbelievers of the existence of God through the force of their beauty, utility, and depredations. He claimed that "there is no foot Souldier so mean in this Army, that it will not quickly overcome all the forces of thy body and minde, and will make thy foul mouth to confess, by their ministry [pain of their bites and stings] that there is a God. Thus then I draw forth my Regiments, so I muster the Souldiers."[20]

The Western Christian tradition that prevailed among European settlers of colonial America advocated a world view in which humans were the dominant life form, superior to all the "lower" life forms, and entirely within their rights to exercise their control over other creatures. This attitude was not always in keeping with the settlers' actual abilities, especially when confronted with problems like overwhelming and damaging infestations. This view also changed over time. A group's historical circumstances, emotional orientation and the intellectual climate affected their cultural attitudes towards pests.[21] For example, elsewhere, some culture groups consumed insects and animals, both ritualistically and for nourishment, that were considered pests by many European residents of the Chesapeake.[22]

A pest is by definition an organism that by its action or presence has a negative impact on some resource valued by people. The resources in question are not necessarily physical ones. They include health and aesthetic sensibilities, as well as commodities.[23]

Attitudes and ideas about pests in American history have been sufficiently negative that aligning someone with pests has constituted slander.[24] The intense emotions of distrust and fear that many people had towards pests were, in part, explained by the risk that pests posed to important resources. While some studies suggest that aversions are learned and not instinctual, others indicate that humans often have an instinctive mistrust of potentially dangerous or dangerous looking creatures. Any learned or latent aversions can be reinforced by cultural attitudes, warnings from parents or peers, and personal experiences with pests. In some cases, fears of potentially dangerous or undesirable animals, objects, and situations can develop into serious phobias.[25]

While statistics on the number of men versus women who developed pest-related phobias in colonial America are unavailable, some twentieth-century test results are suggestive. Studies indicate that adult women are far more likely than men to become entomophobes, or to develop a fear of insects, with some estimated ratios as high as nine to one. It is not entirely clear why this is the case. Some suggest that it is because negative reinforcement about pests, particularly insect pests, is much higher among women, especially between mothers and daughters.[26] It seems possible that the discrepancy in the number of women versus men that develop entomophobia may be connected to the risks associated with insects for both. While both are subject to the depredations of disease, and diminished resources occasioned by the action of pests, women in American domestic environments have historically been responsible for pest control and held accountable for the actions of pests in the home.

Pest issues fit into the larger picture of human history. Besides the dramatic

episodes of infestation, famine, and disease precipitated by pests, or the slew of potions and gadgets connected to regulating pests, pests are always around, have always been a factor in human society, and people are always trying to control them in some way. The pest phenomenon has affected and challenged societies in many ways. The manner in which culture groups react to this problem reflects and reinforces their values and belief systems.

The negative impact on peoples' well-being that pests can have included areas like social standing, which was affected by the appearance of things like insects on their bodies or in their homes. In his poem "To a Louse, On Seeing one on a Lady's Bonnet, at Church," eighteenth-century Scottish poet Robert Burns commented on both social airs as well as the effect that body pests could have on a person's reputation.[27] A sense of duty or responsibility may have been challenged by things like the appearance of roaches in a home in which women were trying to uphold a domestic ideal of cleanliness. Factors like these can and did result in an intolerance of pests in the home, regardless of their real or imagined ability to harm people.[28]

Vermin versus pests

The words people chose to describe pests offer some insight into their view of the creatures. "Vermin" was a term used by the English to designate several small insects and mammal species. For example, the spider was described by Edward Topsel, one seventeenth-century English author, as "being a vermin of singular and incomparable courage,..."[29] In another example, regarding silk and wine production in seventeenth-

century Virginia, one French expert, John Bonoeil, advised setting fires at night to drive away "beasts" that might eat grapes, and he also advised storing silk cocoons in a place where "they may not be pressed together too hard, and where Vermine cannot come."[30]

"Vermin" was the term used most often by the English to describe small animals and pests in early colonial southern America. Captain John Smith identified the weasels and other small mammal pelts used in Native American dress, especially ceremonial dress, as "vermine" skins.[31] The term was also used to designate the object of sport hunting, often raccoons or foxes, in which many Virginia planters engaged. "Vermine Hunting," Hugh Jones wrote, " was very diverting. It is perform'd a Foot, with small Dogs in the Night, by the Light of the Moon or Stars."[32] The term vermin was also used to designate animals and people of a noxious or objectionable kind. In this context, "vermin" encompassed the sense of loathing that modern Americans associate with animals they consider pests. In many ways the term was synonymous with the contemporary usage of the term pest.[33] Predators, insects, and parasites to people, game, crops and goods were all identified as vermin.

In contrast to contemporary usage, terms etymologically linked to "pest" did not designate "vermin" in the colonial era. The term "pestered" served initially in America to designate somebody bothered, annoyed, or troubled by a condition rather than an organism. For example, Captain John Smith used the term "pestered" in the early seventeenth century to describe his canoe trapped in mud; "The Indians seeing me pestred [sic] in the Ose [ooze]..."[34] The term was also used to describe conditions, like overcrowding, that were conducive to disease. For example, in 1625 administrators of the

Virginia Company used "pestering" to describe resettlement patterns in Virginia after the 1622 Native America massacre of colonists; "...many Plantačons being drawne into few places for their better defence. Wch pesteringe of themselves, did likewise breed contagious sicknesse..."[35] William Capps wrote from Virginia in 1623 that ships "pestered" or overcrowded with men carried diseases.[36] Likewise, weather conditions that were believed to cause illness were referred to as "pestilential."[37]

By the mid-eighteenth century in Virginia, items, people, or phenomena understood to be dangerous could be referred to as "pests".[38] Thus, the notion of "pest" had come to be applied to people, vagrants and suspect personages.[39] In addition, homes or hospitals set up for patients with especially dangerous diseases, like the plague or a contagious fever, were referred to as "Pest Houses."[40] Settlers' early use of the term "pestered" aligned it with conditions of dangerous (not merely annoying) overcrowding and disease.[41] Their later usage of the term linked notions of "pest" with dangerous conditions and things.

Towards the end of the eighteenth century animals and insects began to be included among those items, phenomena, or people annoying enough to be considered "pestering."[42] One of the earliest references to an insect, arachnid, or small mammal being referred to as a "pest" comes from a 1795 British encyclopedia under an entry for the scorpion.[43] This was followed shortly after in 1798 by the same usage in reference to a rat.[44] By the early nineteenth century, "pest" was in fairly regular usage in America as a term to designate insects and other annoying animals.[45] The conditions and effects with which pests were aligned became well enough known that a satirical use of the name

"Peter Pester" by a social commentator resonated for many early nineteenth-century Americans.[46]

The transition from using the term "vermin" to using the term "pest" seems to be rooted in connections between vermin and diseases, or between vermin and pestilential conditions. Notions of "vermin" and "disease" were conflated through the use of the term "pest" as it became clearer that these creatures were capable of inflicting considerable bodily injury, pain and illness on humans, and that the mere presence of pests was often aligned with pestilential conditions even well before people had a solid understanding of their role in disease transmission. The fact that vermin and disease both could have devastating effects on human populations certainly contributed to this new usage. This usage also reflected a new perception or understanding of the organisms that had previously been identified as vermin.

The use of the term pest reflected an attitude towards organisms that had the potential to impact negatively on humans' physical, economical, and social well-being in ways that "pestilential" conditions and diseases could. The distinction between the colonial-era usage of the terms "vermin" and "pest" seems to lie in the real, potential, or imagined alignment of the creatures in question with the conditions, transmission, or effects of illness and disease, which were reflected in the use of the term pest. More importantly, the use of the term pest signals a new understanding of these creatures, a new relationship with these creatures precipitated by this new perspective towards them, and a new sense of urgency connected to controlling or eradicating them. An emphasis on killing pests outright emerged at the end of the eighteenth century, and the availability of

commercially prepared pesticides increased. These conditions led to the development of increasingly refined tolerances and the establishment of new physical and mental maps containing boundaries and zones in which pests had to be regulated.

Entomology and History

Despite the importance of insects, including pests, in human history, economy, language and world views, entomological studies have historically not been well supported. In fact, the need to justify the study of insects as a valuable and important activity still appears in contemporary scientific and educational texts. Authors, from the seventeenth century through the nineteenth century, like Mouffet, Topsel and Rennie, argued that by studying insects we can learn more about the world around us, and reveal the glory of God.[47] Peters and other modern entomologists have argued that studying insects is important because human behavior can increase, and by extension, decrease, pest problems.[48] However, the idea that by studying some aspects of insects we can gain insight into human history, behavior and social relations, is generally not advanced. Several scholars have considered the impact that insects have had on humans and history, especially in connection to the devastation they have caused to crops or from disease. However, very few have examined the nature of individual and cultural responses to insects, including insect pests, or how these responses reflected elements of society and human relations.

Seventeenth-century entomological texts, like Mouffet's, that studied insects (as distinct from housekeeping manuals or other sources of pest control information that

discuss insects) were often directed towards the physicians of the era. This was not because of the physician's role in treating insect-related injuries or illnesses, but because of the pharmaceutical uses of many insect species. Mouffet acknowledged that his study was difficult to compile because "Insects are hard to be explained, both in respect of the unusualness of the subject, and also of the sublime or rather supine negligence of our Ancestors in this point."[49]

In Euro-American cultures, those who chose to study entomology were often considered trivial or even insane.[50] [Figure 1] Residents of Virginia and America certainly had a vested interest in insect and other pests that affected their animals, crops and health from the seventeenth century on. However this interest did not manifest itself as a discrete field of action, study and research until the middle of the nineteenth century when it was professionalized by men as entomology. The women involved in regulating pests in their homes and the men who managed agricultural pests can certainly be said to have studied pests in a manner of speaking. However their interest and approach to the topic did not constitute entomology.

Contemporary scientists maintain that the modern field of medical and veterinary entomology dates from 1878 when Patrick Manson discovered that filaria worms were carried by mosquitoes, and that agricultural entomology emerged in the 1860s when an otherwise harmless beetle in Colorado switched its diet to potatoes and devastated crops.[51] It was around this same time period that professional exterminating firms first began to appear in large cities in America.[52] As a result, entomologists and professional exterminating firms did not generally contribute to the pool of resources from which

colonial residents of the Chesapeake were able to draw when designing or selecting their own pest control strategies. While the responsibility for regulating pests in the domestic sphere fell to women, when the practice of extermination was professionalized and commercialized it was re-gendered as a male responsibility. This circumstance was not unique to mid-nineteenth-century urban areas in America. Itinerant male rat-catchers and vermin-killers had been operating in Europe at least since the medieval period.

Disease

Many people in Virginia recognized that conditions conducive to pests were also conducive to illness, but it was not until the last decade of the nineteenth century that any direct connection between insects and disease transmission was discovered.[53] Despite the fact that there was no known connection between pests and disease in the seventeenth century, people still harbored intense animosity towards pests, and many, like Topsel, were struck by the impact such small creatures could have: "These little Insects are not so contemptible as the World generally thinks they are, for they can do as much by their multitudes, as the other [large animals] can by their magnitude"[54]

Similar to variations in ideas about pests, the social and historical perception and definition of disease has been enormously variable over time and place. The concept of disease is also a social construct, defined largely in terms of what is considered normative within a culture group, and what is viewed as extraordinary in terms of bodily function and disorder. However, despite the range of perspectives on disease that exist cross-culturally, they all have one feature in common: any individual who is unable to execute "normal"

tasks as a result of some bodily impairment will generally appear "diseased" to his or her peers.[55]

The alignment of disease with pests goes well beyond the parallels they have as expressions of cultural relativism. First, both diseases and pests can have equally significant impacts on the economy, social structure, health, well-being and history of a culture group. Second, in many cases pests and disease support one another; pests spread parasites, as well as viral and bacterial infections while disease micro-organisms rely on the pests as hosts and carriers to ensure their survival. Third, the alignment of vermin with disease or "pestilence" that became increasingly apparent from the eighteenth century on led to the development of the word "pest" and its modern usage.

The damage to crops, goods, structural materials, personal appearance and even social standing that the activity of pests can produce could be as debilitating to the health, economy, and social structure of a community as the ravages of disease. Both can also have long-term effects on the development of a society, even significantly altering their historical trajectory. Consider the ability of a pest, like the locust, to induce famine on a developing nation, or the effect of a disease, like smallpox, on a previously unexposed group, or even the results of a pest-borne disease like bubonic plague in medieval Europe.

The close endemic relationship between some pests and disease is not uncommon, and it generally results in the continued success of both. Ironically, these successes, potentially detrimental to humans, are often perpetuated by the activities of the very humans they affect. For example, the practice of sedentary agriculture not only created dense, large concentrations of food that attracted some pest species, it also encouraged

humans to settle in cities which allowed for the increased development and transmission of diseases. Expansion of trade enabled by the development of cities also encouraged the importation of new and exotic pests.[56] Albeit there are significant advantages for human societies that created these conditions, including an increased food supply, and opportunities for social, technological, economic and other advances. Nonetheless, these conditions also continually challenged residents to maintain some balance in their newly created ecosystem or run the risk of being decimated by the effects of both the pests and the diseases that thrived in these niches.[57]

European travelers and traders recognized and feared the risks associated with moving across disease boundaries from the beginning of their overseas ventures. They had little information about infection, a poor understanding of disease transmission, and no concept of germ theory. Instead, they attributed many of the fatal and debilitating effects of disease to strange climates. Diseases that were introduced into new populations had a significant psychological impact on both the seemingly "superior" culture that was resistant to these particular diseases and the unexposed population that was decimated by them. The Spanish conquest of Amerindian populations is a classic historical example of this phenomenon.[58]

Improvements in husbandry and agricultural practices in England increased productivity[59] and reduced infections and illnesses significantly from 1650 through 1750.[60] Disease incidence in eighteenth-century Britain was also affected by inoculation for small pox. This procedure was introduced to England in 1721. It became widespread in cities during the 1740s and was generally practiced in rural communities and small towns from

the 1770s.[61] This overall improvement in health beginning in the middle of the eighteenth century came to be referred to as a "mortality revolution" attributed to somewhat vague advances in medical science. Advances in nutrition, clinical medicine, preventative medicine, insect control, and the eighteenth-century environmentalist movement that called for improvements in drainage, ventilation and the removal of obvious filth from city streets, probably had a greater impact. While some of these developments were rooted in aesthetic motives, they incidently had health and safety repercussions in an era when the transmission of disease by germs and infected insects was still poorly understood.[62] Euro-American settlers benefitted from these English advances when the information, resources and support were available to implement them in the New World.

In the American colonial south, human and natural factors affected the region's disease environment.[63] The Tidewater area of Virginia and Maryland is characterized by a topography of tidal estuaries, marshes, grasslands, and forested areas.[64] The areas favored by early European settlers were generally along waterways. While the temperature and rainfall varied year to year in the tidewater, in general, settlers in the Chesapeake region experienced a moist warm climate with short mild winters which supported the growth of pests like mosquitoes or worms, as well as and water-borne parasites that carried diseases. In this climate with culturally created conditions, like garbage heaps or inadequate drainage, most of the human diseases of historical significance were passed from human to human, or from nonhuman vectors to people by insects.[65] Low sanitary standards and wide-scale poverty compromised settlers' health.[66]

Scientists most often identify flies, mosquitoes, fleas, lice, and ticks, in addition to

rats and mice, with the transmission of disease among human populations. In particular, mosquitos are vectors for malaria and yellow fever. Flies can carry typhoid and other diseases from human excrement to food. Ticks carry Lyme disease and relapsing fever from rodents, deer and other mammals to humans. Fleas carry bubonic plague to rodents and humans. Cockroaches can cause allergic reactions, and have been associated with the transmission of sal monellusis, a type of food poisoning, the organism that causes amebic dysentery, and salmonella organisms to humans.[67] Infected flea feces entering broken skin (i.e. flea bites) transmit Murine typhus from rodents to humans. Infected rats transfer trichinosis to the swine, dogs and cats that eat them. Humans almost always contract trichinosis by eating under-cooked pork. Flea bite dermatitis, tick dermatitis, tick paralysis and tick toxicosis are also human medical conditions caused by pests.

In the mid-eighteenth century, John Pringle had associated dysentery with sanitation and decaying organic matter from putrefying animals as a source of disease, but made no direct connection to pathogens or insects as causes of disease.[68] In 1810 the appearance of an unsigned article entitled "Insects in Abundance not Necessarily Connected with Sickly Seasons," in the Medical Repository and Review of American Publications on Medicine, Surgery and the Auxiliary Branches of Philosophy [69] suggested that a connection between insects and disease was prevalent among some people. However the article incorrectly refuted the claim that they were in fact connected "In describing pestilential seasons, it has been very common to notice the innumerable swarms of insects. Some observers of the phenomenon attendant on times of sickness have even been led to the opinion that the growth and multiplication of these tribes of animals is

promoted by that condition of the atmosphere and the waters which is unfriendly to the health of man. We suspect, however, that this is by no means correct."[70]

The belief that the atmosphere and "airs" had a direct bearing on human health was an important aspect of European medieval thought, and it can be traced back to Hippocratic writings. We now know the view that illness originated in malevolent miasmas rising up from organic matter to be inaccurate,[71] nonetheless it led to activities that were, ultimately, in the best interest of public health.[72] Given that disease-transmitting pests, parasites, and germs thrived in the conditions that created the supposedly dangerous miasmas (like swamps, garbage heaps, sewage, stagnant water, etc.), eliminating these conditions effectively reduced problems with disease and infestation. Initiating a project, like constructing drainage ditches, that could eliminate miasma-producing conditions required political, economic, and social resources.[73]

Settlers in the colonial era related both the presence of annoying mosquitoes and the prevalence of fevers to swampy, marshy areas.[74] Those who could afford to do so often left mosquito-infested areas for the summer.[75]Any efforts to regulate mosquitoes should be viewed in light of the intended effect of these efforts, as well as the unintentional, although arguably more significant, impact on the health of the community that these pest control measures may have precipitated.

In seventeenth-century England the well-being of the public was understood to be closely connected to the well-being of the economy and the nation. This perspective led to the development of national public health policies by the 1680s, but throughout the seventeenth century most measures were local and dealt with immediate concerns.[76] In

Virginia, administrators had enacted public health policies even earlier.

Early seventeenth-century settlers, investors and administrators in Virginia recognized that public health was an important factor for their success. Even in the decades before Virginia came under the rule of the English crown in 1624 and had been officially managed by the Virginia Company, officials with the Company were concerned about the health of settlers. In addition to sending medical men to Virginia, administrators also regularly adopted health measures that they felt would help ensure the physical well-being of the settlers, and the success of the colony.[77] The fact that some of these measures and instructions were disregarded could explain why so many Virginia settlers suffered from illness in the early days of settlement.[78] In 1610/1611, administrators at Jamestown, Virginia, imposed strict sanctions on the disposal of all sorts of wastes, on keeping homes clean, and even imposed some furniture specifications in an effort to keep people healthy, well-fed, and well rested. For example, administrators legislated that,

"There shall be no man or woman, Launder or Launderesse, dare to wash uncleane linnen, drive bucks, or throw out the water or suds of fowle cloathes, in the open streete, within the Pallizadoes, or within forty foote of the same, nor rench, and make cleane, any kettle, pot, or pan, or such like vessel within twenty foote of the olde well, or new Pumpe: nor shall any one aforesaid, within lesse than a quarter of one mile from the Pallizadoes, dare to doe the necessities of nature, since by these unmanly, slothful, and loathsome immodesties, the whole Fort may be choaked, and poisoned with ill aires, and so corrupt (as in all reason cannot but much infect the same) and this shall they take notice of, and avoide, upon paine of whipping and further punishment, as shall be thought meete, by the censure of a martiall Court." "Every man shall have an especiall and due care, to keepe his house sweete and cleane, as also so much of the streete as lieth before his door, and especially he shall so provide, and set his bedstead whereon he lieth, that it may stand three foote at least from the ground, as he will answer the contrarie at a martiall Court.".. "...in which hee shall take such order that the lodgings of such as shalbe so sicke or hurt, be sweet and cleanly kept, them-selves attended and drest,..."[79]

The sanction that beds be kept at least three feet above the ground reflected a fear

of dampness,[80] and would have reduced problems associated with pests like fleas, rodents and snakes that were generally more active closer to the ground, and that had a limited jumping range. The regulations imposed by administrators in Jamestown relating to public sanitation and health demonstrate that in circumstances where the impact of disease and infestation extended beyond the concern of a specific individual or family, the acting governing body in Virginia was quick to impose public health sanctions.

In comparison to contemporary understandings of disease and transmission, as well as modern standards of hygiene and sanitation, these seventeenth-century practices, and even later eighteenth-century ones may seem crude. However, it is inaccurate and even unfair to suggest that no comprehension or standards existed. People did have ideas about causation and prevention of diseases, as well as notions of cleanliness and dirt.[81] Wyndham Blanton has pointed out that by the eighteenth century, colonial period medical libraries, personal and professional, were "large and well chosen."[82] The advice these libraries contained was not commensurate with modern views of medicine, health and hygiene, but their presence in Virginia testified to a concern for the health of settlers.

Modifications to the physical landscape at Jamestown, in and around the early fort and the New Town, would also have had an impact on the health of residents. Drainage ditches that cut through the settlements facilitated the drainage of the area when they were flushed out by the rain, and they also helped reduce the problems caused by wastes piling up in and around the settlement (provided they were not allowed to get clogged with trash and stagnant water).[83] If these ditches did accumulate debris or standing water they could have supported pests and pathogens capable of greatly debilitating or even killing residents

of the fort. Properties in the eighteenth-century capital of Virginia, Williamsburg, were also laced with drainage features, landscape modifications, and water supply systems that revealed a sophisticated understanding of hydrology and the importance of controlling water.[84] The success rate of measures like these in Virginia is difficult to determine. The high mortality rate in the early seventeenth century at Jamestown is perhaps an indicator that in addition to deaths related to conflicts with Native Americans, these sanctions were ineffective, that they went unenforced, or that illness and infestations were so rampant that even these measures were inadequate. The lack of references to individuals being punished, according to law, for violating this public health legislation would suggest that everybody respected it, or, more likely, that it was not generally enforced. Furthermore, the presence of trash pits within the walls of the fort also suggests that not everybody traveled the requisite distance from the fort to dump their trash.[85]

In 1609, in the very early days at Jamestown, Virginia residents were reportedly suffering from bubonic plague, yellow fever, or both.[86] Colonial era residents of Virginia were concerned about the plague, although it is often, erroneously, considered a disease of the Middle Ages. In 1721, over a century after cases of plague were reported at Jamestown, William Byrd of Virginia published A Discourse Concerning the Plague, by a Lover of Mankind. In his treatise, Byrd maintained that plague did exist in the New World, and that it was "occassion'd by a venemous taint of the air."[87] He did not recognize that infected fleas and rats were the true source of the illness. The "taint" itself he believed could have divine or natural origins, but once they were infected, people, goods, and the air were all capable of transmitting the infection. Byrd recommended

prayer, quarantine, street and shop cleaning, purifying the air, and fumigating with tobacco to prevent plague.[88]

The threat of illness and injury from pests and disease was as much of a concern at the end of the colonial era in the late eighteenth century as it was for settlers at Jamestown at the beginning of the colonial era in the early seventeenth century. It became critical during the late eighteenth-century movements of the American Revolutionary War. To reduce the risk of smallpox during this time, court rulings dictated that certain areas be avoided. This resulted in the Capital Building in Williamsburg being used to house sick French soldiers, the Court being used as a Barracks, and the Court of Admiralty being held in a private residence, the home of Benjamin Waller.[89] The Justices of James City County, Virginia also received permission to flee Williamsburg and hold court elsewhere in the County.[90]

The link between pests and disease was perhaps most devastating for settlers confronted by yellow fever and malaria. Yellow fever and malaria are both are carried by mosquitoes and both are known to have been health concerns for colonists in America, especially in the American South. However, the connection between these conditions and mosquitoes was not identified until well after the colonial era. Yellow fever is a viral infection transmitted from a person, to a female Aëdes aegypti mosquito who bit the infected person in the first three or four days of their fever. The germs settle in the mosquitoes' stomach, then migrate over the course of the next twelve days into the mosquitoes' salivary glands, from which they pass to another person the next time the mosquito feeds. The mosquito can infect people every time she feeds, roughly every three

days, for the rest of her four month life.[91]

The exact date when yellow fever was introduced to America is not certain. However, outbreaks in New York (1668), Boston (1691), and Charleston (1699) testify to its presence by the mid to late seventeenth century.[92] Medical historian Wyndham Blanton felt that the historical record does not support the argument that yellow fever arrived in America until at least 1647.[93] The ability to identify specific diseases in the colonial era record is complicated by vague descriptions of symptoms, the tendency to lump several conditions under the general headings "fever" and "ague," and variations in colonial era and contemporary medicine, including procedures for diagnosis.

Outbreaks increased over the course of the eighteenth century, so much so that medical historians viewed yellow fever as "peculiarly an American epidemic disease of the Eighteenth century."[94] It was most dramatically, and tragically demonstrated by the 1793 epidemic in Philadelphia. This was considered by medical historian J.H. Powell to be "the most appalling collective disaster that had ever overtaken an American city."[95] It prompted a great deal of alarm in other cities that feared its spread by way of passage and shipping in the Atlantic World. This resulted in the imposition of a series of quarantines, travel restrictions, and public health measures.[96] Physicians of the era described the disease accurately, and many even commented on the presence of large numbers of mosquitoes during the time of the fevers.[97] However, no one understood that there was a direct connection between the two.[98]

Malaria is a bacterial febrile disease that results as a reaction of the body to an infection from parasites of the genus *plasmodium*. The plasmodium are introduced to the

body from the bite of a female anopheline mosquito. Malaria is typically characterized by a pattern of fevers in the victim as the parasite advances through stages in its life cycle. Humans can acquire an immunity to malaria after several cycles of fever, remission and recovery. There are four varieties of Plasmodium that can infect humans. The two most common are Plasmodium vivax and Plasmodium falciparum. While there are no definitive race-related immunities to falciparum, researchers have identified a significant innate immunity to vivax among blacks. In climates, like Virginia's, the relatively mild winter decreases the activity of mosquitoes which can interrupt transmission of the bacteria. Under these conditions it is difficult for malaria to establish itself as a hyper-endemic disease, as it does in the tropics, and it often retains patterns of an epidemic, or eventually endemic disease.[99] Even after the identification of the malarial plasmodium and an understanding of its life cycle emerged in the 1890s, treatment for infected patients was difficult. No vaccine or antitoxin was developed, and controlling mosquito populations was so complicated that significant efforts were not organized before the 1920s.[100]

The prevalence of malaria in early America has been difficult to determine. Descriptions of fevers and agues in the seventeenth- and eighteenth-century Chesapeake do not definitively identify malaria in colonists, but the descriptions that do exist suggest its presence in the area to historians.[101] All of the available evidence indicates that Native Americas were not affected by malaria until the arrival of Europeans in the area.[102] Mosquitoes, however, definitely existed in the Americas well before the arrival of Europeans.[103] While malaria, in general, does not have the high mortality rate associated with yellow fever, it is remarkably debilitating and it left victims susceptible to other

illnesses.

In addition to the impact that these diseases had on the bodies and health of settlers, disease also had a physical, economic and cultural impact. Historians Darrett and Anita Rutman have suggested that the impact of disease on the economy of Virginia affected the structural development of colonial Chesapeake society; a society characterized by exaggerated economic polarization. They determined that illness and death related in significant ways to the basic social organization in the Chesapeake and contributed to the development of a society of open and mixed households with extensive kinship obligations. Furthermore, they proposed that disease conditions may also have contributed to periods of decreased intellectual activity in Virginia (especially in comparison to relatively malaria- and yellow fever-free New England), as well as fostering a "live hard and fast" mentality, and a matter-of-fact acceptance of death in Virginia.[104] In other words, people in the Chesapeake adjusted their social organization in light of the disease environment, and its ramifications, in which they lived.

Clearly, the effects of both pests and disease were important for the failure or success and development of Chesapeake society. Settlers' successes were also linked to the strategies they developed to respond to these factors. The Rutmans highlight the importance of social organization in the Chesapeake. The role that pest control strategies played in defining and maintaining social boundaries was one feature of that social organization. Boundaries across which pests were not tolerated were also used to reinforce lines across which human interaction was negotiated. A study of the specific pests and the threats they presented to settlers in the New World will help articulate the

importance of these boundaries. A consideration of settlers' expectations and goals for the Chesapeake region will also help to explain why regulating the appearance and impact of pests was important to their definitions of success.

## CHAPTER TWO
## PESTS IN VIRGINIA

*"Whites and Blacks, all mixed together, unconstant strange unwholesome weather,/Burning heat and milling cold, dangerous both to young and old./Boisterous winds and milling rains, fever and reheumatic pains/ Likewise the ague without doubt, boils, prickly heat and gout,/Many cellars full of rats, many garrets full of bats./ Mousquetous on the skin make bloches, saulupes and large cockroaches./The water in the wells is bad, which make the inhabitants full sad."*[1]

c.1776-1783 Quartermaster Kleinschmidt

### Perceptions of Virginia

Sixteenth-, seventeenth- and eighteenth-century travelers to the New World from Europe came with a variety of expectations and objectives. These hopes and aspirations affected their impressions of the New World. Settlers' impressions were also influenced by reading the texts or hearing the words of others who described the New World. The real and imagined environment they encountered, which included the presence and activity of pests, was also a significant factor in developing these impressions. The perceived environment, including the effect of pests, can differ significantly from the "real" environment but was arguably just as important.[2]

Often the expectations settlers had of Virginia, based on the rhetoric they encountered and descriptions of the land and its potential, did not coincide with the conditions they actually encountered when they arrived, or while they lived there. While the environment in the tidewater region of Virginia and Maryland from the early

seventeenth century through the third quarter of the eighteenth century was punctuated by periods of drought and very heavy rainfall, in general, it was characterized by warm summer temperatures, high precipitation levels, and relatively mild winters that were capable of supporting microbes, insects and small mammals.[3] The numerous swamps, tidal estuaries, grasslands and wooded areas in the tidewater well also well suited to these organisms. The presence of these pest and disease species required an ongoing response from residents of the region, although the intensity of the problem varied over time and in different niches. In this cultural climate of often contradictory perception and lived experience most authors included very few references to pests in their descriptive tracts of Virginia. In 1612, administrators in Virginia promoted a distinct lack of pests as an attribute of the region by claiming that, "one thing is strange, that we could never perceive their vermine destroy our hennes, eggs, nor chickens no do any hurt: nor their flyes nor serpents anie waie pernitious; where in the South parts of America, they are alwaies dangerous and often deadly."[4] However, other evidence, like a 1624 Virginia Assembly report on the previous decade, indicated that pests were a real and serious problem for people and provisions; "The allowance in those tymes for a man was only eight ounces of meale and half a pinte of pease for a daye, the one and the other mouldy, rotten full of Cob webs and Maggotts loathsome to man and not fytt for beasts, wch [sic] forced many to flee for reliefe to the Savage Enemy,..." "...soe lamentable was our scarcitie that we were constrayned to eate Doggs, Catts, ratts, Snakes, Toadstooles, horse hides and wt nott," and one man even killed and ate his wife.[5] Despite the evidence of pest problems recovered in personal writings, correspondence, diaries, colonial administrators' reports,

archaeological findings, and county records, important and extensive descriptions of Virginia rarely included references to pests.[6] The few references to pests in these published extensive descriptions were most often recorded in connection to examples of human mismanagement, like the careless sericulturist who allowed rats to eat his silkworms, or incompetent administrators who allowed rats to ravage stored provisions.[7]

Settlers' experiences with and their responses to pest problems in the Chesapeake were based, in part, on their expectations of and goals for the region. Settlers were also motivated to design and implement pest control strategies in order to keep the impact of pests in their lives within culturally defined boundaries of the acceptable. The view settlers had of the Chesapeake, the image they wanted to project about the region, and the goals they had for success all affected the type and level of pest control they imposed on themselves, and expected from each other. Promotional tracts like, A Briefe and True Report of the New Found Land of Virginia, A Good Speed to Virginia, A True Discourse of the Present Estate of Virginia, Virginia Impartially Examined, A Discourse and View of Virginia, and The History and Present State of Virginia[8] that represented Virginia as unimaginably beautiful and productive affected settlers' notions about the region. This rhetoric and their own ambitions for success contributed to the settlers' inclination to suppress or ignore pest problems, or to create a climate through pest control that more closely resembled their expectations.

Typically, seventeenth-century published tracts described the New World as a new found Eden of untold wealth and riches.[9] Descriptions highlighted the healthfulness of the climate,[10] the fertility of the soil, the clarity of the springs, the abundance of the wildlife,

and perhaps most importantly, the opportunities for native and introduced commodities to flourish.[11] These descriptions considerably downplayed or largely ignored negative factors and dangers, like vermin, and the impact on health and the economy they could have.[12] Many English authors of the era seemed intent on fostering a certain view of Virginia, or invested in representing the region in a certain light, or blinded by their own expectations for the area. Throughout the seventeenth and eighteenth centuries these authors persistently described Virginia in implausibly good terms. Furthermore, the cultural climate these descriptions fostered may have reinforced the settlers' ambitions for success in Virginia, in an environment in which elements of nature were not construed as impediments to their goals.

The early seventeenth-century English promotional publications that featured Virginia in particular characterized the region as beautiful, unimaginably productive, stocked with easy and abundant game, and capable of supporting the production of exotic spices, silks, and other riches.[13] During this same time period settlers in Virginia were actually experiencing a seventy-percent mortality rate due to disease, starvation and Native American raids.[14] The misfortune that many suffered seemed partially due to the incompatibility of the first English settlers to Virginia to the demands that a settlement endeavor required. Contemporaneous authors, like Lord De-La-Ware in 1611, and modern scholars, like archaeologist William Kelso, have suggested that many of the early Virginia settlers were "mischievous," poor, idle, terrible administrators, or gentlemen who lacked the craft skills needed to built a settlement.[15] Over time, historical, economic, political, and natural events supplemented the information in promotional publications and

contributed to the New World's and Virginia's reputation.

In the American colonial era, the connection between climate and illness was believed to be a direct and causal one.[16] Settlers had an understanding of physiology and medicine rooted in the humoral theory prior to the development, in the nineteenth century, of an understanding and acceptance of the germ theory of disease. Tropical climates, or warm and wet climates, were considered especially dangerous and required certain rules of behavior to ensure the safety and survival of Europeans moving into these areas. Many medical treatments were preventative and intended to maintain the humoral balance of the body that could easily be offset by heat, humidity, and perspiration. In general, the guidelines for hygiene and good health revolved around the intake and expulsion of fluids.[17] From the perspective that incorporated climate into an understanding of illness, the emphasis that many narratives of the New World placed on climate assumes a new significance. Promotional tracts did more than merely paint a picture of an attractive and fertile region. These descriptions were closely connected to establishing the New World as a safe and nonfatal region.

The realities and challenges settlers encountered were described by only a few authors who offered a more objective view of the region that included information some would consider negative. For example, while authors like Ralph Lane recognized that Virginia certainly had a good climate and resources, he felt that plans to export commodities from Virginia were not economically viable. He expressed a concern in the late sixteenth century that, "... nothing but the discovery of a rich mine or of a passage to the South Sea will make our countrymen settle in Virginia."[18] Commentators also pointed

out that, for many travelers, the summer heat in Virginia was intolerable and dangerous.[19]

By 1620, reports downplayed earlier disasters in Virginia and dispelled rumors that the area was barren and unprofitable.[20] Invested in the success of the settlement, members of the Virginia council reported that Virginia, "is a Countrey, which nothing but ignorance can thinke ill of, and which no man but of a corrupt minde and ill purpose can defame," and "...the Colony beginnith now to have the face and fashion of an orderly State, and such as is likely to grow and prosper."[21] Statutes that required settlers to develop luxury products, like wine and silk, reinforced the sense that the colony could prosper and produce very valuable commodities. Supporters of these statutes, like John Bonoeil, maintained that there was no excuse for failure with these products because, "Herein there can be no Plea, either of difficulty or impossibility; but all the contrary appears, by the naturall abundance of those two excellent Plants afore-named [mulberry trees for silkworm food and grape vines] every where in Virginia: neither will such excuses be admitted, nor any other pretences serve, whereby the businesses be at all delayed."[22]

Insects and other pests presented more of a problem for many settlers in Virginia than they had in England.[23] The reality of the climate conditions they encountered, like the seasonal heat and numerous swamps and marshes in the tidewater area of Virginia, coupled with human behaviors, like inefficient waste disposal and food storage, exacerbated pest problems. Many pest problems were worsened by practices, like closing doors and windows at night to keep out mosquitoes and night air (which was believed to be unhealthy).[24] While shutting homes up kept some pests out, it simultaneously enhanced the conditions in which many pests species thrived, like heat, dampness, and inadequate

ventilation. Some settlers recognized that the rivers and creeks in Virginia made travel and shipping easy, but few acknowledged the flood and pest problems to which the swamps, tidal rivers and other waterways could contribute.[25]

Provisions as well as people were affected by the ravages of pests in Virginia. Early settlers at Jamestown discovered that some of their stored food supplies contained as many worms as grains,[26] and that on at least one occasion in November of 1608, residents of Virginia reported that environmental and administrative conditions were so bad that, "When the shippes departed al the provision of the store but that the President had gotten, was so rotten with the last somers rain, and eaten with rats and wormes as the hogs would scarecely eat it; yet it was the souldiers diet till our returnes:...."[27] Water damage, rats, fire, and other factors also reduced available rations.[28]

All of the reported impediments to achieving the kind of financial successes that the Virginia colony settlers anticipated, like labor shortages, mismanagement, laziness, or political battles, were represented as faults of men and not nature. As such, these factors did not compromise Virginia's status as Eden. Rather, they provided further opportunities to remind people how beautiful and bountiful Virginia was, despite men's unwillingness or inability to fully respect and take advantage of that potential.[29] This resulted in a perpetuation of the pattern, now routine, of describing Virginia as paradise into the eighteenth century.[30]

Even after more than a century of settlement in Virginia, many Virginians maintained many of the habits, customs and lifestyles of the English. Despite some adaptations to circumstances in the New World, English settlers considered Virginia an

extension of England and their home.[31] They relied heavily on English publications as a source of information. By the mid-eighteenth century the English residents of the colony were no longer predominantly immigrants, as they had been in the seventeenth century, but native-born Virginians.[32] An emotional and cultural investment in Virginia as "home" may have contributed to the apparent unwillingness to disparage Virginia in any way. Also, by characterizing Virginia as paradise and an example of God's wonders, authors drew on Judeo-Christian traditions that endowed the region with cultural, emotional and spiritual qualities settlers may have found difficult to question. Furthermore, the fact that Virginia was named after Elizabeth I, the Virgin Queen, and considered an embodiment of the Queen, may also have made some less inclined to be openly critical of the colony. For example, Robert Beverley, a prominent resident and historian of Virginia reported in 1705 that, "...being so well pleased with the Account [of Virginia] given, that as the greatest Mark of Honour she [Queen Elizabeth I] could do the Discovery, she call'd the Country by the Name of Virginia; as well, for that it was first discover'd in her Reign, a Virgin Queen; as that it did still seem to retain the Virgin Purity and Plenty of the first Creation, and the People their Primitive Innocence:..." He also stated that, "from the Virgin Queen, and the apparent Purity of the Indians, and primitive Plenty of the Place that new discover'd Part of the World was named Virginia."[33]

The perception of Virginia as "virginal" and a completely natural, untamed wilderness was inaccurate even before English settlers arrived. Native Americans had cleared some land for their settlements, burned over some to make it easier to hunt game and cleared other areas for cultivation.[34] Furthermore, from the day the English arrived in

Virginia, their behavior and activities had an impact on the land that not only affected existing animal and plant populations, but also the "natural" conditions in which settlers imagined they were living.[35]

References to the presence of human body pests, like fleas, among the Indians was one way the English had of distinguishing themselves, and the conditions in which they lived, from the Native Americans. English visitors to Chief Powhatan's house reported that, "We had not bin halfe an houre in the house before the fleas began so to torment us that wee could not rest there, but went forth, and under a broad oake, upon a mat reposed ourselves that night..."[36] The absence of fleas, or an abundance of them, was used as a marker of "civilization" among the English. In reality, the English were also plagued by the annoying fleas. By highlighting the presence of fleas in the homes of Native Americans the English drew attention to living conditions, building traditions, housekeeping practices, and personal tolerances that the English felt were beneath the standards they themselves upheld. In this case, one of only a few references to pests among the Native Americans, pest control for the English functioned not only as a practical response to a real nuisance and potential health hazard, but as an indicator of social and cultural distinction. The decision to draw such a distinction was also an act of social boundary maintenance between themselves and other groups.

People for whom insects in the New World were interesting and who mentioned them in personal papers, scientific reports or other correspondence, include naturalist Pehr Kalm, a Swedish botanist and agriculturalist who traveled in North America from 1748-1750. He established the presence and prevalence of mosquitoes, flies, gnats, ticks,

bedbugs, lice, fleas, cockroaches, and moths even in climates cooler than the American south.[37] Others who made early entomological notes where those on whom insects had an especially significant impact, like Captain John Smith of Jamestown, Virginia who was troubled by mosquitos, flies and cockroaches, or elsewhere in the New World, the pirate John Esquemeling who was tormented by flies.[38]

By the last quarter of the eighteenth century some of the exaggerated descriptions of Virginia began to ring hollow, and evidence or experience from other sources besides promotional tracts was having an effect on perceptions of Virginia and the New World. The presence or absence of pests did, in some cases, seem to be a standard by which areas were judged, especially in the eighteenth century. For example, land outside of Williamsburg was praised by travelers as, "the back Country of Virginia,...is as fine and rich land, as any in the world, producing all kinds of grain and grass in perfection, and great abundance, being also extremely temperate in Climate, and having scarce any Musquitos, or other troublesome Insects."[39] Observers were eventually forced to acknowledge seasonal variations and that the area had changed, due in part to having been exploited by settlers. Over clearing and planting of crops like tobacco exhausted the soil quickly. Changes in the soil allowed for the new kinds of plants and animals, including weed and pest species, to possess the land.[40] Yet still, authors of promotional literature, like Lewis Evans, continued to advance the fertility and paradise qualities of America..[41]

Researchers like H. Roy Merrens and George D. Terry claim that most settlers did not have the ability or inclination to critically examine promotional tracts for evidence or corroborating proof of their claims about Virginia, and that as a result these reports had

little effect.[42] However, the prevalence of these tracts, and of those claiming to dispel myths and untruths perpetuated by other authors, suggests that somebody was taking these reports very seriously, and that they were, in fact, shaping popular views of the New World and Virginia.

Pests and People in the Chesapeake

By the eighteenth century, the population in Virginia had become diverse culturally and economically, and various peoples brought their traditions, cultural practices and perspectives to the area.[43] In addition to the Native American population, which still had a presence despite being pushed westward or internally sequestered, the African and African-American population was increasing and a flood of German and Scots-Irish immigrants had moved to the Shenandoah Valley of Virginia. The expectations and experiences of all these people would have contributed to notions about Virginia, attitudes towards pests, and ideas about regulating them.

The reality of the environmental conditions of the Chesapeake meant that pests were more of a problem than in England.[44] The areas in which settlers in Virginia most often reported problems with pests fell into two zones, agricultural space and domestic space. Agricultural pests were those that damaged or interfered with the production of crops or livestock. They presented a problem to the agricultural economy. Agricultural pests not only threatened the fortunes of individual planters, but also posed broader challenges to the strength of the regional and colonial economy. The agricultural zone was one for which men, the white planters, landed gentry, or farmers, were concerned.

Personal papers of the era and period publications suggest that the planters felt agricultural pests were inevitable. The best that a person could do was to exercise some preventative strategies to reduce or eliminate pests in his fields, and to implement some reactionary strategies if pests appeared. Agriculturalists tried to regulate pests to some degree, but they acknowledged that pests, as well as weather, available resources, labor shortages, and other factors could affect productivity in ways that were beyond their control.[45]

Domestic pests were those that affected residences, their residents, furnishings, and foodstuffs. In the white Euro-American culture, the presence of pests in the home was viewed as the result of a failure on the part of the mistress of a household to keep an orderly home. While tolerances and standards relating to pests in the domestic sphere varied over time, there were always some standards in effect. Despite the social, economic, and cultural pressures on women to maintain these standards, there was very little discussion in the prescriptive literature about seventeenth- and eighteenth-century domestic pest management schemes that were preventative. Most were designed to respond to a problem once it had already developed. This may have been due, in part, to a lack of understanding about the development and life cycles of domestic pests. It may also have been rooted in the understanding that if a woman performed her other housekeeping duties responsibly, explicitly preventative pest control strategies would not have been necessary.

In general, in the area of agricultural pest control in the colonial era there are more examples of preventative strategies, while in the area of domestic pest control the

strategies are more often reactive. Planters made attempts to prevent the development of a problem in the first place, but also had strategies for eliminating pests if they made an appearance. In the home, in the early colonial era, pest management schemes focused on eliminating insect and small mammal pests after they appeared without taking clear cut steps to prevent their appearance in the first place. While activities like properly storing food and keeping a home clean had pest control and prevention advantages, they were not explicitly preventative in the ways many agricultural schemes were (for example, soaking seeds in pesticides). Furthermore, women had other motives, incentives and responsibilities for engaging in activities, like cleaning or supervising cleaning, beyond their role in pest control. For example, women cleaned to extend the life of items, to reflect a certain social standard, to distinguish themselves from others, to fulfill their Christian duty as they understood it, and to establish boundaries between different zones or spaces.

Agricultural Pest Control

The specifics of strategies selected to protect against agricultural pests were similar in many ways to those selected for use against domestic pests. The terms people used to speak about agricultural and domestic pests, and the manner in which control strategies were applied to each group indicates that they definitely fell into two different categories. A consideration of the responses to the problem of agricultural infestation is important to this study of domestic pest control practices. It allows for a clearer understanding of the two categories, it provides the opportunity for comparisons, and it

helps to highlight the importance of different kinds of boundaries and the lengths to which people will go to protect them.

Some pest control issues crossed over the established categories of agricultural or domestic pests. For example, both livestock and poultry presented the problem of potential injury from pest control strategies designed to protect them. Men were typically responsible for livestock, while women were most often responsible for tending fowl.[46] Trapping was one means of catching pests while protecting the livestock and poultry from the risk of poisoning associated with chemical control strategies.[47] Weasels, for example, targeted poultry and stored foods, but many kinds of poison would put the poultry or food at risk.[48] In that regard, weasels can be considered a domestic pest.

The problem of pests drawn to stored goods intersected domestic and agricultural pest control, as do the strategies people selected to control them. Weevils were a particular problem for stored goods[49] The presence of snakes was on occasion viewed as a pest preventative because they ate rodents that could destroy crops and stored goods, but in and around the home they would be considered dangerous.[50] In the case of snakes, the context in which the snake was found determined its status as a pest or a pest control agent. Even in the area of nomenclature agricultural and domestic pests had some crossover. For example, "chintz" bug was a term used to identify an insect pest that did substantial damage to crops,[51] and the term chintz bug was also used to refer to bed bugs in America.

Residents of the Chesapeake considered insects, birds, small mammals and large predators agricultural pests. Moles were a problem for planters because they dug up crops

and created dangerous terrain for livestock.[52] Flies[53] and other insect pests damaged crops.[54] Birds ate seeds, tore up seedlings, and consumed many crops.[55] Chemical[56] as well as mechanical strategies were employed to discourage and destroy agricultural pests. In addition to spreading simple repellents[57] and complicated poisons[58] onto fields and crops, planters discouraged infestation by pre-treating seeds, covering crops with brush,[59] fumigating fields and orchards,[60] protecting fruit with net, letting fowl eat pests off plants, and manually removing individual pests from the crop in question.[61]

As late as the middle of the seventeenth century many authors, like Edward Topsel or W.W., the author of The Vermin-killer, who offered suggestions to planters to combat agricultural pests, simply repeated and reprinted strategies from antiquity. Some of their recommendations would be considered highly superstitious by contemporary standards, and several were even considered superstitious in the seventeenth century. For example, one scheme suggested, as a last resort, having a naked menstruating virgin "flowing with Nature's shameful filthy bloud [sic]," with her hair hanging down walk around the infested area three times and caterpillars would drop off and die.[62] Despite its inclusion in the prescriptive literature of the era, there is no evidence to indicate that this particular method was practiced in the New World. However, strategies rooted in religion, superstition, folklore, or from perspectives other than that of the modern scientific community were, and still are, practiced in America.

Perhaps the most revealing thing about this particular, albeit unusual, strategy is the commentary on women and their role in connection to pest control. The woman selected to perform the ritual was represented as having the power to control infestations.

Through a combination of mechanical, chemical, and spiritual means she could regulate pests while simultaneously defining and protecting the boundaries of the zone in question. By the seventeenth century in Virginia, the zone for which women were responsible was the domestic sphere, which included the home, kitchen garden and poultry. In fact, a woman's failure to keep the presence, activities and impact of domestic pests within the bounds of cultural tolerances compromised her identity as a successful or "good" woman.

Imposing bounties on agricultural pests underscored the importance of agricultural pest control. In the seventeenth and eighteenth centuries, colonies and counties in Virginia regularly offered bounties for creatures deemed detrimental to agricultural production. In an effort to rid their communities, farmlands, and woods of "vermin" believed to be especially dangerous to people, livestock and crops, it was common to pay individuals in cash or goods for turning in the requisite number of dead vermin, or, alternatively, a representative body part, like the tail or scalp, that was accepted in lieu of the entire animal.[63] However, these bounty programs did not include a consideration of the impact some of the same creatures had in the domestic sphere, nor did they extend to insects and animals whose activities were restricted to the domestic sphere. Bounties for animals, vermin or pests of the home or body were unheard of. In this era bounties were intended to address pest problems with larger animals that were believed to impact the larger community or economy in a significant way, rather than for typically smaller domestic pests which were viewed as a problem of the individual or household.

In both Maryland and Virginia, legislature was established that outlined reward

systems to be used for the capture of vermin ranging from wolves, bears, squirrels, and crows. Wolves and bears were feared in part for the injury they could inflict on people, but more generally they were perceived as a significant threat to livestock, and perhaps also to the settlers' sense of control over their environment. One seventeenth-century English author, Topsel, suggested that it was simply shameful to tolerate wolves without offering some resistance.[64] Squirrels and crows were hunted because of the great damage they did to crops, especially corn. They ate seeds and turned up seedlings, in addition to eating mature crops. Bounties for squirrels, as well as the archaeological recovery of squirrel-gnawed items, indicate that they were a real problem.[65]

The details of these bounty programs varied over time and from county to county but the principle was the same; a cash or tobacco reward was offered in exchange for material evidence of dead vermin.[66] In Virginia, by the 1770s these "incentive" programs were reinforced by laws that required heads of households to produce a certain number of crows or squirrels, according to the size of their households, or incur fines for each missing animal below the requisite number. Some planters expanded the program on their own property by offering rewards to their slaves or hired hands who helped gather such vermin.[67]

These bounty programs were effective against large predators, like wolves and bears, whose numbers were relatively low compared to crows and squirrels. However the effectiveness of such a plan against squirrels and crows was questionable. The smell, appearance, and health risks connected to transporting animal heads, tails, and scalps until they could be duly recorded by the Justice of the Peace was not discussed, nor was the

condition of his office or yard during bounty season (generally spring when young and nesting vermin were easier to catch). The schemes developed in the New World to capture these pests, like schemes used for household pests, include a variety of traps and poisons.[68]

Apparently, in England, squirrels were not as much of a nuisance, pest or agricultural threat as they were in the New World. Topsel described them as harmful to woollen garments, but otherwise pleasant and useful creatures.[69] In Virginia, at the same time the bounties were being paid out for killing squirrels, they were also popular figures in ornament, decoration, poetry, and even as pets.[70] Within the context of the home and removed from the agricultural zone, squirrels seemed not to be considered pests. At least some people in Williamsburg, Virginia, found squirrels sufficiently attractive and nonthreatening to adorn their dinner dishes. [Figure 2]

Both the fox and the hare were also included in English prescriptive literature about trapping and pest control. Typically, control strategies for these creatures involved traps, poisons, or hunting, often with the aid of dogs.[71] However, few references to their effect on colonial era residents of the Chesapeake, or to settlers' attitudes towards these animals survived. Furthermore, neither was included in bounty programs geared at reducing the populations and effects of troublesome vermin. While they may have posed a problem, they were not addressed in the same sources that reveal information about other agricultural and domestic pests in the Chesapeake area.

Domestic Pests

A range of small animals and insects were considered pests in the domestic sphere, while others were tolerated. Descriptions of these pests often reflected attitudes towards them and the range of strategies selected to regulate them. The creatures most often identified in prescriptive literature, descriptive tracts, and personal papers as affecting the domestic sphere were: mosquitoes, roaches, lice, fleas, bedbugs, rats and mice which caused the most consternation, while flies, ticks, hornets, wasps, bees, chiggers, moths, and ants also created problems. Spiders were present but not generally considered pests. The strategies people relied on to regulate or eliminate pests were based on expereince, oral traditions, and prescriptive literature. They seem to have been strategies that were, to some degree, effective. They included ingredients to lure pests away from a designated area, ingredients to poison pests, and devices to restrict pests' access to a protected zone.

Mosquitoes were, by far, the most frequently mentioned insect pests in the New World throughout the seventeenth and eighteenth-century. The mosquito is any one of several varieties of a winged insect in the Culicidae family. The females of most of the mosquito species have a proboscis through which they draw blood for food.[72] The tiny puncture wound the proboscis creates leaves painful, itchy welts on humans. Mosquitoes lay their eggs in the water, but different species prefer different locations and water conditions.[73] They are attracted to perspiration and sweet fragrances on humans.[74] Mosquitoes led Tyrone Power, a traveler in the New World, to curse, "But Oh! Immortal Gods, how they did hum and buzz! And how I did fume and slap and snatch and swear!"[75]

Mosquitoes, which were far more numerous and annoying than the similar "fen

gnats" encountered in England, were a particular nuisance in the Chesapeake. Mosquitoes bit people and livestock[76] unmercifully, their buzzing and humming annoyed,[77] and, although colonists were not aware of the direct connection, mosquitoes transmitted serious diseases.[78] Some sense of the problems and numbers of mosquitoes in colonial Virginia was expressed by Landon Carter in September of 1764 when he cried, "Vile Musketoes...as plenty as bees in a hive."[79]

After a lengthy and detailed account of the benefits of Virginia, in 1705 Robert Beverley summarized the negatives as, "On the other side, all the Annoyances and Inconveniences of the Country, may be fairly summed up, under these three Heads, Thunder, Heat, and troublesom [sic] Vermin."[80] He discounted the thunder as harmless and the heat as very seldom a problem, and explained that, "All the troublesom [sic] Vermine, that I ever heard any Body complain of, are either Frogs, Snakes, Musketas, Chinches, Seedticks, or Red-worms, by some call'd Potato-lice."[81] Many people viewed mosquitoes as a simple, albeit unpleasant, fact of life.[82] However, colonial administrators in Virginia found their actions so contemptible that they listed it as one of the major reasons they chose, in 1699, to move the capital of Virginia from Jamestown, a swampy, marshy area, to Middle Plantation, located on higher, drier ground (later named Williamsburg). They felt it was a healthier and more convenient place, and "freer from the Annoyance of Muskettoes."[83]

Curiously, mosquitoes were also the pests for whom the least number and range of preventative, repellent, or control strategies were cited. Remedies designed specifically for mosquitoes or gnats are rare in seventeenth and eighteenth-century British prescriptive

literature. Mosquitoes and biting gnats existed in England, where they were commonly referred to as "fen-gnats," or "midges."[84] Occasionally, it is difficult to make distinctions between references to gnats and mosquitoes because the terms were use interchangeably in many cases.[85]As Samuel Pepys noted, these small buzzing, biting insects were annoying as well as potentially painful and disfiguring,[86] while Colonel Landon Carter found they interfered with sleep, spoiled otherwise good days, caused him to call on God for some relief,[87] and for Benjamin Henry Latrobe, they rendered life "perfectly miserable."[88]

While they existed elsewhere in the world and caused severe problems for English travelers and traders,[89] in many ways mosquitoes became a decidedly New World concern. The French and the Spanish complained about mosquitoes in Florida in the sixteenth century, and reported that the Native Americans were seriously troubled by them as well.[90] Despite well-known episodes in scripture, classic antiquity, and history in which biting gnats subdued entire armies and very powerful men, the presence and habits of mosquitoes in the New World were not enough to discourage colonization,[91] even after reports came in that these biting insects attacked more frequently and fiercely in America's warm climes than any where in England.[92] The impression that mosquitoes were really only a serious problem in the tropics and southern colonies is solidly contradicted by the experiences of travelers, traders, colonists and naturalists in the mid-Atlantic and northern regions, including Canada.[93]

Scientists and naturalists knew that mosquitoes bred in swamps and standing water. Even if they were not familiar with the details of their life cycles, the average colonists were aware that mosquitoes were much more prevalent and troublesome in

warm, marshy areas, although they appeared all over the New World.[94] Col. Landon Carter noted that problems with insect pests like mosquitoes were seasonal, and felt their only relief came from favorable winds that drove them off, or frosts that killed them.[95] Yellow fever and malaria were carried by mosquitoes that generally lived in marshy areas. Efforts to reduce illness from the "miasmas" which were believed to be the cause of disease occasionally resulted in draining the swamps which inadvertently affected the true source of the fever, mosquitoes.[96]

It seems that no one was free from the ravages of these "Lilliputian Lancers."[97] Pests, and disease were both democratic annoyances. Even the wealthiest, most elite settlers, at their most formal gatherings and in the privacy of their well-furnished homes, were plagued by mosquitoes and their bites.[98] Seventeenth-century readers were advised by British physician and amateur entomologist Thomas Mouffet, that gnats and mosquitoes were good for fish bait, but mostly they were just troublesome. He went on to report that efforts to dissuade gnats and mosquitoes with popular remedies, like a "fly-flap,"[99] a blast of breathe, or by sprinkling water among them, were ineffectual. Instead he recommended using particular perfumes, fumigations, and ointments to drive them away.[100]

He also reminded readers of the Grecian practice of suspending a covering or a net of linen, woollen, or silk as a kind of tent around their dining rooms and beds to keep the insects from entering, but suggested that people in mid seventeenth century England did not use similar mosquito netting.[101] Some in the medieval era used mosquito netting to protect themselves, but the practice was expensive and not common.[102]

Rather than tents of mosquito netting some Englishmen who lived near swamps used a "fen-canopy," which is not much of a canopy at all. Mouffet described a fen-canopy as "being made of broad, plain, half dry, somewhat hard pieces, or many pieces together of Cowes dung, and these they hang at their beds feet." Insects were drawn to these pieces and away from the sleepers. Mouffet added that Englishmen relied on fly-flaps during the day.[103] The English were not unique in their use of animal dung in their homes to draw insect pests away from people. Olaudah Equiano, born in 1745 in Benin in Africa before being enslaved and moved temporarily to Virginia, reported a similar practice in his homeland; "Our day houses are left open at the sides; but those in which we sleep are always covered, and plastered on the inside with a composition mixed with cow dung, to keep off the different insects, which annoy us during the night."[104] Evidence that the English in Virginia used "fen-canopies" to draw away mosquitoes has not been recovered.

Fans were popular accessories for elite ladies in the Chesapeake. [105] There is evidence that fans, ostensibly used for cooling or as hand held accessories for modesty, communication and decoration, were also used to fan away mosquitoes. The benefits of a fan as a pest control device were restricted to the one individual holding it, or being fanned by another. The risks involved in using a fan were tied up in the social conventions connected to the fan's use as a communication device. Ladies used a particular set of gestures, positions and fanning motions to nonverbally convey information. For example, a fan flip could let a potential suitor know to continue his conversation, or move along. A sudden jerk to keep a mosquito off might send the wrong message to someone relying on

the motion or position of a fan for cues. In addition, the fan would really only have been helpful for problems with mosquitoes in the head area. It was not socially acceptable to fan the entire body with a hand fan.

The Native-American, African-American and Medieval English strategy of using smoke to drive away mosquitoes was also practiced by the colonial Virginians.[106] The elaborate fumigations recommended by some authors seem to have been less popular than simply constructing smoky fires, even indoors.[107] In some areas, constructing smokey fires was overwhelmingly the most popular, albeit disagreeable, strategy to respond to mosquito problems.[108] The risk of setting a house on fire or of asphyxiation from the smoke made this practice risky.

Mosquito netting also was available to those who could afford it, and for the truly wealthy, screens, often referred to as rat-wire or for the smaller gauge, "fly-lattice" was available from England.[109] It seems that wire screens were most often used to protect pantries, dairies, spring houses, and cellars from pests, and were not generally installed on every window of a home or its dependencies.[110] Estimates are that it took about twenty yards of mosquito netting or pavilion gauze to fully envelop and protect a bed and its occupants.[111] Visitors to the homes of prosperous planters in Virginia noted that their beds were often draped in mosquito netting.[112] [Figure 3] Over time, mosquito netting became more popular and less expensive. By the middle of the nineteenth century it no longer appeared to be a device owned exclusively by the very wealthy.[113] Netting was not the only response to the mosquito problem. Chemical repellents that had been in use for centuries were still popular in the nineteenth century.[114]

Another pest that settlers often mentioned, and for whom they expressed a particular distaste, was the roach. Jared Bean summarized the sentiments of many of his Almanac's readers when he wrote:

> *The agile bookworm eats, conceal'd from sight,*
> *Also the prowling mouse abhors the light,*
> *But be assur'd that Philobiblos knows,*
> *The hellish Cockroach is the chief of foes.*
> *Jared Bean, Almanac for the Year 1774*[115]

There are five cockroach families within the order Blatteria; Blattidae, Blaberidae, Blatellidae, Polyphagidae, and Cryptocercidae.[116] Roaches are oval flat-bodied insects, several species of which are common household pests.[117] Worldwide, at least 3500 cockroach species have been identified, only fifty of which are considered domestic pests, and only half of those like to live in, rather than around, houses. Of the 69 known species in America, more than two thirds are not native to the New World, and none of the five considered to be the worst household pests (the American, German, Oriental, Smokey brown and Brown banded cockroaches) are native.[118] Not all of the varieties of cockroaches currently considered pests in American homes had been introduced to North America in the colonial era.[119] Outdoors, cockroach populations are controlled in part by their natural enemies, like spiders, wasps, woodchucks and toads. Indoors, they have few predators besides humans.[120]

Besides being merely annoying, roaches can transmit diseases by frequenting filthy areas and contaminating food or unprotected areas with bacteria they carry from place to place.[121] Roaches are largely nocturnal. They can move about unobserved and be very difficult to detect and control.[122] Roaches eat human food, garbage and sewage, as well

as other materials in the home, like wallpaper, glue, paint, insulation, plaster, leather and other bugs.[123]

Roaches regurgitate partially digested food periodically and defecate wherever they are. These excretions have a powerful and repugnant odor that is characteristic of roaches. The roach contaminates and soils food and other items with this disagreeable and potentially disease transmitting excrement.[124] Despite their proclivity for getting into everything and eating anything, roaches are not technically considered "pantry pests." Their size prevents then from gaining access to relatively well-packed foods, and their need for a constant and abundant supply of water makes dry food storage areas unattractive to them.[125]

Some remedies for controlling roaches were provided in Thomas Mouffet's compendium on insects, The Theatre of Insects. It was published in 1658, although written a generation earlier. In addition to reprinting pest control methods from the classical era, Mouffet also included contemporaneous strategies.[126] Early remedies combined toxins, like wormwood or hemlock, with food, like bacon grease, molasses or bran. The women of the household formed these mixtures into little balls or cakes and left them for the roaches to eat. Later schemes used poisons like white arsenic and phosphate paste. These poisons would have been fatal to the pests, and dangerous to pets, children, or adults who unknowingly consumed the insecticides.[127] Other remedies that Mouffet suggested included prayers, spells, or incantations intended to control the roaches or protect the residents of a household from their depredations.[128] Receipts for roach repellents often included cucumbers which deter these insects.[129] Women continued to be

advised by early nineteenth-century authors of domestic encyclopedias and prescriptive literature to kill roaches with highly toxic chemicals.[130] Late nineteenth-century remedies for roaches were in keeping with earlier remedies [131] but began to show a trend away from the use of especially dangerous chemicals.[132]

Besides texts in domestic economy or vermin killing, few other seventeenth and eighteenth scientific works considered cockroaches. However, roaches were included in late eighteenth-century encyclopedias as examples of insects species.[133] Information about roaches most often appeared in personal papers and domestic economy manuals. Housekeepers seeking additional information about roach problems asked one another for help. One 1798 reader of The Weekly Magazine of Original Essays even solicited information about pest control from other readers of the paper.[134]

Insects recognizable as cockroaches appear in the western world at least as far back as the classic period. Heat and moisture loving bugs that thrived in ancient Roman baths were characterized as "lucifugia." This was an all encompassing term that included roaches, rats and other "light-fleeing" pests. This term, and the Greek name *blattae* were used for several centuries to identify insects that were, most likely, cockroaches.[135] The term cockroach is too modern to appear, for example, in the Bible or in any of Shakespeare's writings. In England, in the late sixteenth and seventeenth centuries, roaches were still identified as members of the Blatta family. Mouffet categorized roaches as a sort of "moth."[136] He identified the Oriental roach, in particular, as the "Unsavory or Stinking Moth." Descriptions in Mouffet's work suggest the roach may also to be known as the black beetle, and the black clock.[137]

Mouffet personofied the roach as cruel, nasty, rough, thieving, living off nocturnal depredations after an infamous manner, living around outhouses, ditches and steamy soggy places, and prone to "not only annoy those that stand near it, but offends all the place thereabouts with its filthy favour."[138] He theorized that the "Stinking Moth" reached Europe from Asia through travel and trade along the Silk Road. Mouffet also reported a specific episode in 1587 when Sir Francis Drake captured a roach infested Spanish ship, and unwittingly carried roaches back to England.[139] As international trade expanded so did the opportunities to carry roaches and other pests all over the world. Once established in England, roaches were found in cellars, houses, attics, warehouses and even churches.

In the New World, Spanish adventurers coined the term "cucarachas," which roughly translates to contemptible caterpillars, in reference to insects believed to have been cockroaches. Captain John Smith of the Virginia Colony misheard, misspelled or intentionally modified this term, giving it its contemporary pronunciation, when he reported the presence in 1624 of "a certaine India Bug, called by the Spaniards a Cacarootch, the which creeping into Chests they eat and defile with their ill-scented dung."[140] This description suggests that it was probably the Oriental cockroach with which early settlers in Virginia were having problems. Entomologists theorize that the German cockroach may not have arrived in America until the return of soldiers from Prussia after the Seven Years War, from 1756 through 1762.[141]

Although the Greek term "blatta" was still in use, especially in scientific contexts, Smith's "Cacarootch" had become "cock-roche" or "cockroach" by the middle of the eighteenth century. Charles Darwin identified it as a "cock-roach" in his 1859 edition of

The Origin of the Species, and by 1900 Americans were referring to it simply as the "roach."[142]

Cockroaches are notably absent from the realistic scenes of the Dutch Masters, the works of French Impressionists, and other artists. However, lice, rodents and other pests were represented in art.[143] Seventeenth- and eighteenth-century representations of roaches included engravings in scientific texts and encyclopedias, like Mouffet's rough woodcuts of "stinking moths," and naturalists' illustrations, like Maria Sibylla Merian's 1705 Metamorphosis Insectorum Surinamensium.[144] This is an illustration of a wild pineapple in bloom that included a stylized rendition of the American and German cockroaches in several developmental stages. Merian hoped her work would allow gentleman scholars to see "what wonderful works and animals God has created in America."[145] Gentlemen scholars remained unimpressed by the roach. However, some, like Grainger provided readers with increasingly detailed observations of the roach's behavior and appearance.[146]

American and English printers regularly included detailed engraved images of cockroaches and other insects in encyclopedias by the late eighteenth century. [Figure 32] Advances in scientific knowledge, the wide availability of the microscope, and advanced printing techniques all supported this development.[147] However, publishers continued to describe roaches in these texts with negative language and details that were not included in the descriptions of other non-pest insects.[148]

Although many people feel a distaste for roaches, David Gordon claims thatas insects go, roaches are intelligent, hardworking, fastidious groomers and one of the oldest and most successful creatures on earth.[149] Since it has only recently been determined that

several million people suffer from allergies to cockroaches and their fecal matter, and that they could be considered mechanical vectors of disease, the development of the intense loathing people have for them stemd from some earlier and deeper cause.[150] Roaches continue to present problems for modern Americans.[151]

In addition to mosquitos and roaches, lice were also common pests in colonial Virginia. Lice are tiny flat bodied, wingless biting or sucking insects of the order Anoplura. Many varieties of lice are body pests or external parasites of animals including humans.[152] Two species of lice generally live on humans, the body or head louse, and the pubic louse.[153] Their bites itch and can cause skin discoloration.[154] Their feces can transmit serious diseases.[155] The archaeological recovery of prehistoric combs with wide teeth for grooming hair, and narrow closely-set teeth, well suited to removing lice and nits, indicate that humans have had problems with lice for thousands of years.[156] Some might argue that considering the small size of a louse, several could easily be tolerated by an adult. However, in addition to the personal discomfort and social embarrassment many feel from the presence of lice, they are capable of transmitting diseases, and a chemical in their saliva produces lethargy in humans. This feeling of fatigue connected to lice bites very likely accounts for the origin of the term feeling "lousy." Since the development of new and powerful insecticides in the World War II era, problems with lice have been considerably reduced in contemporary America.[157]

While problems with body pests tend to be, often inappropriately, aligned with the lower social or economic classes in modern society, in the past, members of the social elite where not as hesitant to acknowledge their personal struggles with lice, bedbugs, and

other body pests. In his diaries, the English aristocrat Samuel Pepys reported several episodes in which he encountered lice. On a 1668 trip to Salisburg he reports that he and his traveling companions found their beds "good" (i.e. comfortable), but themselves "lousy." "Which made us merry..."[158] On another occasion he did not find the presence of lice as entertaining; "So to my wife's chamber, and there supped and got her cut [sic] my hair and look my shirt, for I have itched mightily these six or seven days; and when all come to all, she finds that I am louzy, having found in my head and body above 20 lice, little and great; which I wonder at, being more that I have had I believe almost these 20 years. I did think I might have got them from the little boy, but did presently look him, and found none - so how they came, I know not; but presently did shift [i.e. change his clothes], and so shall be rid of them, and cut my hayre close to my head. And so, with much content to bed."[159] Besides the trouble he had with lice at home, Pepys also reported that on several occasions his wig-maker brought him a periwig infested with nits and lice. He was as annoyed with this repeated negligence on the part of his wig-maker as he was with the itching lice. Eventually, he decided to buy one elsewhere.[160]

Besides simply picking lice and nits off the body and head, in the seventeenth and eighteenth century authors, housewives, mothers, and naturalists offered a variety of other remedies to get rid of lice. "Remedy" serves as a particularly appropriate term to characterize these strategies because most often the problem of body pests was approached as a medical condition. When such remedies appeared in domestic economy manuals, including cookbooks, they were listed among treatments for illness, diseases, skin conditions, and injuries rather than among the recommendations for cleaning, or

"housekeeping." Later in the eighteenth-century, remedies to destroy lice and nits began to appear in the cosmetics sections of such manuals.[161] This suggests a shift in perspective of the problem from a medical condition to an aesthetic or cosmetic concern.

Edward Topsel advised readers of his 1658 encyclopedia of animals that a fumigation made from spiders would cause lice to fall off, run away, and never more breed in that place again.[162] Although, recommendations that the affected areas be rubbed with a solution, salve or ointment were more popular. These remedies generally included ones designed to kill the lice with poisoned bait, as well as topical applications intended to kill them just by coming into contact with the insecticide.[163] Some of these poisonous receipts had internal applications, for treating worms, and external applications for treating cutaneous disorders including body pests.[164] The ingredients ranged from plants, to oils, metals (especially mercury or "quicksilver"), minerals, and solvents.

The presence of lice was closely connected to cleanliness by some as early as the sixteenth century.[165] However, suggestions for treating, cleaning, or removing clothes, where body lice actually lived and bred, or for trimming the hair to cut away nit-bearing hairs and facilitate future picking, are not included in the prescriptive literature.[166] Evidence from personal papers and diaries indicate that at least some people recognized the lice-reducing benefits these strategies offered.[167] This discrepancy suggests that while "professionals" viewed head and body lice as a medical problem, warranting medical treatments, the afflicted recognized it as a physical condition that could be addressed with both chemical and mechanical or manual strategies.

In all the strategies, the objective appears to have been to destroy the lice and the

nits rather than simply to remove them, or to make the body inhospitable to them. This suggests that lice were considered a stronger threat than pests that were simply kept at bay or drawn away, like flies often were. The fact that lice actually infested personal clothing and the body made them a more personal threat that some other pests, and their presence may have contributed to a greater sense of violation. However, for at least some travelers, the louse proved a handy companion. One tale, seemingly folkloric, asserts the louse's utility as a directional compass.[168]

Fleas were similar to lice in their habits and effects. Fleas are small bloodsucking insects of the order Siphonaptera. They are wingless and especially adapted for jumping.[169] They are intermittent parasites that are common in temperate regions. They feed on a warm-blooded host, but their developmental stages progress off of a host for most species of flea.[170] Many species have relatively long lives, between about one hundred and five hundred days, and can survive for long periods, between about thirty-eight and one hundred and twenty-five days, without feeding. This allows them to continue an infestation, or carry a pathogen even in the extended absence of a vertebrate host.[171] About 250 species of flea occur in the United States. Twenty of which are know to feed on humans, and five of which occur most frequently in the home. They are the cat,[172] dog,[173] human,[174] northern rat,[175] and oriental rat fleas.[176] Although the most significant characteristic of fleas, medically speaking, is their role in disease transmission, their bites are also very annoying and hosts can quickly develop a hypersensitivity to fleas.[177] While it is difficult to calculate accurately, Susanne Whayne believes that fleas, as a vector of diseases like bubonic plague and murine typhus, have caused more human deaths than all

the wars ever fought.[178]

Unfortunately, throughout much of human history, flea-ridden rats were not recognized as the critical agent in the transmission of these diseases to human populations. While some aligned fleas with the plague, until the early twentieth century, even most medical authorities refuted any connection.[179] Unclean or ill-kept homes, businesses, warehouses and other areas encouraged the proliferation of rats and their fleas,[180] as did architectural traditions that inadvertently provided niches and nesting materials for rats. Once the fleas were introduced to an environment, the same conditions that proved conducive to rats also supported fleas. In addition, fleas could remain a threat, concealed in cloths, rags, bedding, furniture, etc. in a home well after their original rat host had perished or moved on.[181]

For fleas that feed on humans, hiding places under rugs, in furniture, behind baseboards, or between floorboards are often adequate living spaces. People have recognized at least since Roman times that fleas lingered in these areas, and some developed strategies to discourage their proliferation in their homes. For example, in Roman antiquity, the wealthy tried to reduce available flea habitat by sealing cracks in the floor with beeswax.[182] Women have been advised in domestic advice manuals since the fourteenth century on how to keep their homes, and husbands free from fleas.[183] Fleas were not equitable or logical in their attacks on people.[184] Flea control strategies included ways of killing as well as drawing fleas away from the potential human victims.[185] A cold winter or the Great Fire of 1666 in London may have significantly reduced the spread of plague by killing fleas.[186]

Many of the strategies popularized by seventeenth-century publications were drawn from classical authors, but they do not represent a clear continuity in practice from ancient times through that era.[187] Strategies for destroying them included locking them up away from light and air. Seventeenth-century sources provided suggestions for drawing fleas and flies away from people with an attractant, in addition to killing them outright with poisoned bait. Late seventeenth- and eighteenth-century sources focused more heavily on eliminating fleas entirely with heavily poisoned baits and less on simply drawing fleas away.[188]

Fleas were definitely found in the New World, and were believed to have immigrated with the English settlers themselves, although some colonists felt that they must have also existed in the New World before the Europeans arrived.[189] Fleas appeared most often appear in documentary sources as the bane of travelerss existence, and a serious impediment to sleep.[190] By the late eighteenth century fleas were still enough of a problem that they were identified as a "familiar sort of vermin" in an encyclopedia of the era, and believed to be more attracted to women than men.[191] The fact that women were responsible for cleaning, and implementing the strategies associated with reducing flea populations, which put them at greater risk of coming into contact with fleas, was not discussed. Nor was the fact that women's clothing often consisted of more fabric and more layers than men's wardrobes did, which created more flea and flea egg habitat.

By the late eighteenth century, fleas had become an object of scientific study and not simply naturalists' curiosity. Through their observations scientists and naturalists gained an increased knowledge and understanding of fleas' habits. Armed with this

knowledge, they developed control strategies that interrupted the fleas' reproductive cycle, or eliminated specific conditions conducive to their survival.[192] The main concern with fleas up through the early nineteenth century, and before an understanding of their role in disease transmission, was reducing the physical irritation their bites caused people.[193] This concern differed from those people had about flies in their homes. Flies and their behaviors were aesthetic nuisances. They made annoying noises and soiled household items with their flyspecks. The actions of both fleas and flies lent them to abstraction as disparaging metaphors for human behavior.[194]

The human bed bug, *Cimex lectularis L.* has piercing-sucking mouthparts in both the nymphal and adult stages making it capable of feeding on human blood after it hatches from the egg. They are largely nocturnal and stay hidden during the day, most often in the bedrooms or sleeping quarters. They prefer dark, close niches and can be found in mattress ticking, bed frames, furniture joints, decorative carving, under wallpaper, behind baseboards and like places. They emerge at night, find a host, insert their mouthparts, withdraw a small amount of blood, and return to their hiding places. They usually feed once between each molt and again prior to reproducing. Their scent glands emit a strong and distinctive odor that is particularly noticeable if they occur in large numbers, and explains their alternative common name, the stink-bug.[195] Two America neologisms regarding bedbugs developed in the colonial era. First, the practice of referring to them as "bedbugs" rather than simply as "bugs" as was common in Europe.[196] Second, Americans also referred to bedbugs as "chinches," which seems to be derivative of the Spansih "chinche," or "chintzs."[197]

Bedbugs were present in England at least since the sixteenth century, but their numbers increased and they spread significantly around 1670.[198] They also lived in Colonial America, although it is not entirely clear if they immigrated with the colonists, or if they already existed in the New World. Eighteenth-century naturalist Peter Kalm reported that settlers claimed they saw fleas and lice among the Native Americans, although they never encountered any evidence that Indians were troubled by bedbugs. He said that others insisted bed bugs found on bats proved that they were originally in North America, and that the bats passed the insects to human populations by roosting in their garrets, lofts, and chinks in the settlers' homes. Although, Kalm pointed out that the reverse was possible as well: bats could have contracted bed bugs from humans by roosting in their houses.[199] Regardless of origin, Kalm claimed that settlers in the New World could not bear the inconvenience of these vermin and that they relied on a variety of strategies to eliminate them. The strategies promoted in domestic economy manuals mostly involved cleaning, scalding or smearing poisons on the bed frame to expel bedbugs. William Hugh Grove reported in 1732 that Virginians claimed to wash their bed curtains every two weeks, "'but the truth is they seldom use any in Summer nor Testers or Hed boards because of the Chintzes or Buggs which are plenty.'"[200] These schemes did not preclude reinfestation. Kalm noted that some settlers considered bed frames of sassafras wood repellant to bedbugs, while others found no other remedy for the painful bites, disfiguring swelling, and unpleasant odor of bed bugs than patience.[201]

Seventeenth-century remedies generally offered a wider range of ingredient options than earlier recommendations, and they required a more thorough understanding

of poisons. Many were drawn from receipts recommended by the ancient scholars. It was not uncommon for receipts to include an adhesive or gummy component that ensured the insecticide would not run out of the cracks and crevices, while simultaneously sealing in any eggs or bugs hidden in the joints. [202]

These remedies were included in prescriptive literature sections on cleaning, painting, varnishing, building practices[203] or under miscellaneous. Remedies were not generally included on the sections concerned with cookery or medical advice.[204] The bedbug was so pernicious a pest that remedies to destroy or repel them even found their way into encyclopedias with descriptions of insects.[205] By the middle of the eighteenth century, the concoctions intended to destroy bedbugs got increasingly complicated and dangerous, and receipts often included directions for handling the dangerous ingredients..[206] Perhaps so as to distinguish themselves among the flood of receipts available, or as an acknowledgment that the women implementing these strategies had a range of concerns about these pesticides, some authors like E. Smith in The Compleat Housewife, began to include information about staining, cost, and safety with their recipes. [207] All of these remedies reflected an awareness of the insects' behaviors and physiology. Both the developers and the users of these pest control strategies had to know where insects lived and bred, what would be toxic to them, and what sealants they could not chew through. The appearance of commercially prepared insecticides on the Virginia market towards the end of the eighteenth century reduced the responsibility of the women using these products to know about the properties of ingredients and vermin's physiology, since all they had to do was apply the product in the manner prescribed by the

manufacturer.[208]

Wealth did not protect residents of the Chesapeake from the depredations of bedbugs. The prominent Carter family of Virginia and their staff had problems at home and traveling with bedbugs.[209] In fact, wealth may have contributed in some ways to problems with bedbugs by supporting the fashionable and relatively expensive practice of using feather beds in many homes, which were believed to be especially hospitable to bedbugs.[210] Regardless of the financial resources available to some people, they still may have had difficulty in obtaining some of the ingredients or elements recommended in some of the receipts.[211] Despite improvements in pesticides, standards of cleanliness and an understanding of the pests, in many parts of the American South travelers reported being pestered by bedbugs throughout the nineteenth and into the twentieth century.[212]

The small mammals that were especially troublesome for settlers in the Chesapeake area were mice and rats. Mice are any of the small rodents of the family Muridae or Cricetidae. They are characterized by their long, slender practically hairless tails.[213] Topsel described the mouse in the seventeenth century as "vulgar," "an inhabitant of our houses," and a "gnawer of all things."[214] He referred to the mouse as "she." He went on to report that "the Epithets of Mice are these; short, small, fearful, peaceable, ridiculous, rustick, or Country Mouse, urbane, or City Mouse, greedy, wary, unhappy, harmful, black, obscene, little, whiner, biter, and earthly."[215] They lie in the hollow places in walls or in roofs. He felt that they were a particular annoyance to man because they loved to eat the very items which were produced for the nourishment of man, like grain and cheese. Topsel acknowledged that due to their habit of tasting all the cheese before they settled on the

one they one they deemed the "best," mice were depicted in Egyptian hieroglyphics as representative of sound judgement and good choice.[216] He made a distinction between house mice and "wilde filed-mice." Field mice were very destructive to crops and people were at a loss as to how to destroy field-mice completely. They were also aligned with pestilential diseases.[217]

Topsel referenced the popular beliefs that some mice reproduce both by copulation and spontaneous generation, while the house mouse reproduces exclusively by copulation and they are in general "most libidinous."[218] He reminded the reader that the mouse's appetite for sex was so well known that "mouse" became a metaphor for lustful, or not a virgin, especially in reference to women. Because, the examples Topsel cited for this metaphor usage were from classic antiquity,[219] it is not clear if the term "mouse" was still used popularly as a metaphor for lustful though the seventeenth century.

Topsel claimed that mice were believed to be deceitful in manner and lent themselves to comparison with men who behaved similarly.[220] A variety of cultural traditions and prohibitions against eating mice stemmed from the fact that they were perceived as a unclean and deceitful.[221] Topsel reported that people felt that even eating foodstuffs that had been bitten by mice was enough to induce illness and skin diseases.[222]

Animals like cats, weasels, owls and hawks were encouraged to eat mice. Other suggestions for controlling mice included driving them away with a variety of repellents and poisons. Weasel body parts and concoctions with weasel parts and products as ingredients were among the repellents used to drive mice away.[223] Other remedies included ashes of weasel or cat mixed with water and sprinkled over fields, mixing food with gall of

ox to poison mice, mixing hemlock seed with hellebore, "wilde cowcumber," or hen-bane, or using bitter almonds, bear's foot, or leaves of Rhodadaphe.[224]

Topsel reported on the existence and use of incantations to control mice. He advised against the incantation, still in use, dating from antiquity that Apuleius said the people of Bithynia used. This spell counseled the farmer to repel mice by giving them notice, in writing, of his intention to kill them.[225] Topsel included information on incantations although he makes it clear that he finds them "more worthy of derision than imitation." However, he acknowledged that others used them, and he did not want his inventory of control strategies for mice to skip any period practices.[226]

Until the late eighteenth century, the historical record indicates that the majority of schemes used to reduce the presence and activity of mice were chemical. Traps appeared in Dutch art and elsewhere, but poisoning seemed to be the preferred method. In England and America traps are essentially of three types, deadfall, chokers, and cages. Although in some parts of Wales, and Spanish America large wooden cradles or swings were hoisted up to the ceiling on pulleys to keep bread and grains out of reach of mice and rats. There is little to suggest that this device was adopted in European-America.[227] When these kind of devices were employed in the home, they constituted an important element of food preservation.[228]

An even greater problem for settlers in the Chesapeake than mice was rats. The rat is any of several varieties of the genus Rattus. They are long-tailed rodents, similar too, but larger then mice.[229] Much more information about rats than mice was included in books about how to destroy vermin, in personal papers, and in other historical sources.

Mice were certainly perceived as a nuisance, but not to the degree that rats were.

Nesting, gnawing, and hungry rats caused significant damage to crops and materials, and they were important vectors of diseases, the most notorious being the bubonic plague.[230] The species of "black rat" that carried plague in Europe seemed to have originated in India, where they existed in the wild. However, rats quickly became a "weed species" when they were carried, by travel and trade, and were introduced to a wide variety of new ecological niches. In and around human homes was one niche in which rats thrived.[231]

In the New World, rats became the mammals settlers most loved to hate. Michel Guillaume Jean de Crèvecoeur, an eighteenth-century french diplomat and author working in America, was unable to conceptualize the extent of the damage rats caused, or to understand why "Nature" would create both rats and mice, creatures of such destructiveness.[232] Rats were especially problematic in areas where their presence was simultaneously encouraged and discouraged by human activity. Although these circumstances characterized the nature of humans' interactions with rats everywhere, some situations bear this irony out in as a particularly dramatic way.

In the seventeenth-century Chesapeake area it became fashionable for some wealthy families to construct and maintain orangeries. These were small, well-insulated and heated structures designed to support tropical orange trees. In addition to being attractive and fragrant, orange trees were expensive and very difficult to maintain in the mid-Atlantic region. Anne Yentsch, a Chesapeake archaeologist, explained the importance of maintaining an orangery; "Owning an orangery gave a family symbolic control over the

plant kingdom," and, "symbolic control of nature was and continues to be a way in which humans define and demonstrate cultural mastery."[233] Presumably, they enjoyed eating the oranges, as well. Unfortunately, this symbol of wealth, power and control was an ideal habitat for rats and mice.[234] Debates ensued about how to destroy the vermin, or make the orangery less hospitable to them, without compromising the success of the trees. In the end, J. de La Quintine, a seventeenth-century horticulturist argued that living with rats and mice was preferable to losing precious orange trees to frost. The cultural and social advantages of owning an orangery and displaying flourishing orange trees outweighed the disadvantages of having rats and mice around.[235]

In circumstances in which settlers did not feel there was any advantage to letting rats stay around, they developed as a number of chemical and mechanical responses to eliminate or control them. Those beleaguered by rats used trapping and poisoning schemes in ancient times that persisted in European culture at least through the fourteenth-century.[236] However, in the New World there was a discernable shift towards chemical strategies from the seventeenth century through the first half of the eighteenth century. Recipes for concoctions designed to drive away, disable, or kill rodents appeared in a variety of sources. They included prescriptive manuals, like The Vermin-Killer,[237] personal papers, like a planter Robert Cole's seventeenth-century account book with an entry for "½ one pound of arsneck or Rattsbane,"[238] and legal records, like Virginian, Lord Botetourt's 1770 estate inventory that listed a small wire cage.[239] Recipes for these poisons proliferated and appeared in an increasing variety of publications through the eighteenth century, including prescriptive literature, advice manuals, and newspapers.[240]

By the mid-eighteenth century newer, commercially prepared, chemicals became available and were used as ingredients in these poisons. In addition, the use of traps to catch rats and mice increased.[241]

Evidence for the intentional incorporation of architectural elements in buildings designed to discourage rats also increased in the eighteenth century. For example, prominent Virginian, Colonel Landon Carter made architectural decisions to protect his birds from rats; "Colo. Tayloe's Ralph sent here to cut my dishing capstones for my Pigeonhouse posts to keep down the rats."[242] Settlers became increasingly aware that some architectural details could facilitate infestation and impede clean-up efforts. Carter complained about his expensive wainscoted walls that, "Wainscoted rooms have their conveniences [inconveniences?] as a dead rat has been stinking behind mine in the hall at least 6 days and is now intolerable in spite of burning tar." He noted the following day that, "This dead rat stunk prodigiously."[243] The choice of certain construction details, traps, barriers and other devices constituted a more mechanical approach to addressing vermin problems than the chemical strategies settlers previously preferred. Residents of the Chesapeake persisted in their use of traps to capture and destroy rats and mice, either independently or in conjunction with poisons, well into the nineteenth century.[244]

By 1768 the issue of rat control had become serious enough for Englishman Robert Smith, "Ratcatcher to the Princess Amelia" to publish his treatise on capturing and destroying rats, The Universal Directory for Taking Alive and Destroying Rats and all Other Kinds of Four-Footed and Winged Vermin.[245] Other guidebooks on managing pests, like J. Southall's A Treatise on the Cimex Letularius; Or, Bed Bug, also became

popular at this time.[246] Whether these texts written by exterminators like Robert Smith or by domestic economists, their advice about domestic pests was intended for household use and implementation by women.[247]

In the later eighteenth century controlling rats was even more of a concern for New World settlers than for Londoners. However, both rats and mice had also become objects of general interest, entertainment and newsworthiness. Stories about exceptional episodes involving rats and mice appeared in newspapers and popular periodicals.[248] Detailed scientific entries on different species of rats and mice, describing their appearance, behavior, physiology, and origins, appeared in American encyclopedias. While these late eighteenth-century descriptions were generally devoid of the strong negative language included in many earlier works,[249] they continued to include the authors' personal opinions about rats and mice; opinions which were notably absent from entries about other sorts of animals in the encyclopedias.[250] As a topic of public concern and curiosity, interest in the topic of rats and rat control continued to grow in the early nineteenth century the United States. Strategies to destroy rats continued to appear in the popular press including newspapers, periodicals and journals. Some of the schemes were simply reprints of receipts that appeared elsewhere, while others were letters written to editors, or articles that drew their authority from some scientific organization that endorsed the suggested remedy.[251]

The distaste that people had for rats led easily to their use in metaphor. Landon Carter described a stomachache as, "The wind run about my body like the rats behind a Wainscot."[252] Political disputes lent themselves well to the Aesopic allegory of "The Rats

and the Cheese" in which the powerful disguised their own self interest in some virtuous guise.[253]

Flies were yet another serious household pest. Flies are winged insects of the order of Diptera. Early observations of the fly in Europe had established by the late sixteenth century that they reproduced by "coupling" as well, it was believed, by spontaneous generation from "putrefaction." Naturalists, like Mouffet, noted that flies grew from little worms laid by the flies.[254] Flies and other insects were of interest to settlers in Virginia right from the outset. John White recorded the appearance of some in his sixteenth-century illustrations of New World flora and fauna.[255] Some were noted because of their unusual characteristics, for example the fire fly, "A flye which in the night semeth a flame of fyer."[256] Others were noted for their unusual annoyingness, for example, biting insects like the gadfly or horsefly, which were "not only a great grievance to horses but likewise to those that ride them."[257]

Some seventeenth-century characterizations of the fly assigned human qualities to the insects by describing them as cleanly, valorous and having a certain prowess, although others, including the ancients, considered them dirty and idle.[258] Flies were considered useful by those, like Mouffet who felt that, "These little creatures so hateful to all men, are not yet to be contemned [sic] as being created of Almighty God for diverse and sundry uses. First of all, by these we are forewarned of the near approaches of foul weather and storms; secondly, they yeeld [sic] medicines for us when we are sick, are food for diverse other creatures, as well as Birds and Fishes. They shew and set forth the omnipotency of God, and execute his justice; they improve the diligence , and providential wisdome of

men."[259] A certain tension emerged in the literature between this view and the more prevalent view, popular since at least the fourteenth century, that flies were an annoyance that was best removed from the house.[260] This tension between the fly as a pest and simultaneously an agent of God grew over the course of the seventeenth and eighteenth centuries.[261] As late as the twentieth century, poet Ogden Nash questioned the fly's existence; "God in His Wisdom made the fly. And then forgot to tell us why."[262]

A variety of fly species were a serious problem for farmers,[263] but in the domestic sphere, it was the housefly with which people were most concerned. In the seventeenth and eighteenth centuries people were unaware of the housefly's capacity to transmit disease, like typhoid.[264] As a result, strategies designed to regulate flies often just drew them away, reduced an annoyance, or addressed aesthetic concerns. For example, flies were drawn away with ferns by some in medieval Europe. Seventeenth-century responses to flies focused on chemical strategies to poison them and seem to have been based on reducing the annoyance they caused.[265] Eighteenth-century strategies focused on more aesthetic concerns, like the mess flies made in the form of flyspecks on glass and gilt items. The schemes designed to control flies, largely mechanical rather than chemical, were not primarily intended to kill the flies, but rather to draw them away from the items or spaces at risk.[266] To ease the irritations caused by flies some relied on fans of feathers[267] or on the "fly-flap."[268] Often made of leather, rushes or bristles, the fly-flap was generally intended to drive or slap away flies, not to kill them.[269] The fly-flap allowed people to brush flies away when there was no available or appropriate surface against which to crush flies. They were also useful to riders for whom crushing a fly against their mount could have

confused the horse. Devices that were intended to swish flies away from humans or animals persisted through the nineteenth century and later in America.[270]

Their dirty and pernicious character, derived in part from the fact that they were believed to emerge from filth, contributed to the use of the fly as a signifier or cultural indicator of "dirty," polluted, or tainted situations. For example, early views of witchcraft considered the fly to be a witch's or wizard's familiar; "Witches and Wizards will have their Familiar to be alwaies in likenesse of a Fly, using the body of a bad creature to far worse purposes."[271] Landon Carter disparaged his son's habit of keeping his dogs and their attendant insects around all the time, and expressed a concern that presence of such pests was inconsistent with the appearance a gentleman should present.[272] In another example, after British troops withdrew from Williamsburg, Virginia, the heavy population of flies was described as a plague left by the enemy, and in many cases they became synonymous with the British.[273]

Ticks, presented another pest problem for settlers to the New World. Ticks are, in fact, not insects but Arachnids. They are any of several varieties of louse-like bloodsucking parasitic creatures of the family Ixodidae in the order Acarina. Many ticks are vectors for infectious diseases.[274] While ticks are in their adult phases they often attack larger mammals like livestock and humans. During their first two active developmental phases they tend to derive blood from small rodents.[275] Ticks range in size from 1.2 to 28 millimeters, or about 1/50 to 1 1/8 inches. Many different species of ticks are found in the United States. One of the most prevalent is the American Dog Tick or the Eastern Wood tick *(Dermacentor variabilis)*. They are long-lived and attack humans,

dogs, horses, cattle, swine, sheep, cats and other mammals. They are usually found in the woods, uncut grass fields, parks or among wild vegetation. Another common variety, the brown dog tick *(Rhipicephalus sanguineous)* only occasionally bites humans. However, it does like to live in the cracks and crevices of human houses.[276] Ticks were considered by some early settlers in the New World to be among the "most vexatious" outdoor pests that they encountered.[277] For many people, their bites or a resulting secondary infection constituted a significant health concern.[278] These outdoor pests were readily transported indoors on people, animals, clothing, vegetation, or wood. The effects of their activity, including the irritation, undesirable appearance, or even illness they caused places ticks within the category of domestic pests under examination here.

Similarly, hornets, wasps and bees fall into the same category of pests. Hornets, wasps and bees were generally not vilified in descriptions of these insects or of America, despite their painful stings. They were objects of naturalists' curiosity.[279] Some English sources did include remedies for killing wasps,[280] and examples of devices like wasp tongs and wasp bottles existed in England. It is interesting to note that these devices were designed for killing one or just a few of these insects at a time, which suggests that problems with large scale infestations of these stinging insects was not a concern. Hornets, wasps and bees were not frequently discussed as being a problem, a pest, or a nuisance. Furthermore, no archaeological or documentary evidence of wasp tongs and bottles and like devices has been recovered in Virginia for the seventeenth or eighteenth century. Rather than making any efforts to eliminate hornets, some settlers actually welcomed them in their homes, because hornets ate flies which were considered more serious pests.[281]

Bees were mentioned or discussed largely in connection to their use in apiaries and hives and for honey. Acknowledging that bees did sting, at least one author noted the use of tobacco smoke to drive bees away to get at honey.[282]

Chiggers are a family of six-legged larvae of the family Trombidiidae that lodge under the skin and cause intense itching. Also known as chigoes, jiggers, harvest bugs or harvest mites,[283] they are a much greater problem in warmer tropical climates, but also live in Virginia. Chiggers were a notable problem in Virginia, not only because of the irritation their bites caused, but because of the risk of secondary infection that their bites created. Captain John Smith noted that problems his men had with chiggers in Virginia were modest in comparison to the great difficulty the Spanish experienced in Florida. Smith accepted the chigger trouble and theorized that every important endeavor should be expected to encounter some opposition, natural or otherwise.[284] In general, chiggers were only rarely mentioned in seventeenth- and eighteenth- century literature.[285] This may have been due, in part, to the relative degree of difficulty people were experiencing with them compared to other pests, or to the fact that chiggers are so very small they are almost impossible to detect without magnification. It is also likely that people may have conflated chiggers with other pests like seed ticks. Like the ticks, chiggers are "outdoor" pests that can get carried indoors, and whose impact on humans places them in the category of "domestic" pests.

Moths were insects that posed no threat of physical injury to the Chesapeake settlers. Nonetheless, they were immediately recognized as pests. Moths are any of the many species of insects of the order Lepidoptera. They are largely nocturnal, have stout

bodies, compared to butterflies, and hairy antennae.[286] During the larval stage of development they eat animal and plant fibers. Seventeenth-, eighteenth- and nineteenth-century discussions of moths occur almost exclusively in "cleaning" sections of domestic manuals and other prescriptive literature.[287] There was no indication that moths or their activity in the home was considered a medical issue, (in the way lice and other domestic pests were), but rather an aesthetic and financial concern.[288] Their impact was the damage they did to textiles, fabrics and furs. Peter Kalm described the destruction moths caused; "Moths, or Tinea, which eat the clothes, are likewise abundant here. I have seen cloth, worsted gloves, and other woollen stuffs, which had hung all the summer locked up in a shrine, and had not been taken care of, quite cut thro' bu these worms, so that whole pieces fell out. Furs which had been kept in the garret, were frequently ruined by worms, that the hair went off by handfuls. I am however, not certain whether these worms were originally in the country, or whether they were brought over from Europe."[289] Remedies to eliminate moths became more frequent in the nineteenth century.[290]

While some ants bite, they constitute another variety of pests that are more of a threat to things than to people. Ants are any of the various social insects of the order Formicidae.[291] They eat food stores, especially sweet things, and can seriously damage structural wood by chewing it away to create galleries and nesting sites.[292] Ants were considered a nuisance in England and some strategies for eradicating them appeared in the vermin-killing manuals.[293] However, they were not mentioned much in American sources. Ants were of interest to American scientists, like Benjamin Franklin.[294] Besides eating things, ants also proved to be a nuisance simply by getting into things and places where

they were not welcome. For example, they tormented artist Benjamin Henry Latrobe by crawling across his paintings and getting into his water glass while he painted.[295] Strategies to respond to problems with ants did not change much from the seventeenth through the nineteenth centuries. These strategies involved repellents or poisons more often than traps. Late nineteenth-century remedies for eliminating ants were in keeping with those of earlier eras,[296] although, by then there seemed to be a move away from a dependence on powerful and dangerous chemicals.[297]

Given the scarcity of snakes in England, especially venomous snakes, one might expect a dramatic reaction on the part of the English to the presence and effects of snakes in the New World. This does not appear to be the case. References to snakes came most often from naturalists who acknowledged they could be a danger.[298] Snakes of all sorts and from all places were vilified in seventeenth-century "scientific" English texts.[299] As a metaphor, snakes are complicated. In ancient Egyptian traditions they were a sign of power. Judaeo-Christian traditions invoked the Book of Genesis to associate the snake with temptation and the devil. Given the predominantly negative associations with the snake in Christian and Euro-American cultures, the significance of its appearance as an icon of the American fight for freedom is not clear cut. A segmented snake, with each body section representing a colony, appeared in newspapers in Pennsylvania and Boston in 1754 accompanied by the text "Join or Die," or "Unite and Conquer."[300] These images clearly conveyed the message that by working together against their oppressors the colonies could be a formidable threat.

Despite contemporary opinions of spiders as pests, domestic spiders rarely

appeared in seventeenth- and eighteenth- century contexts as "pests."[301] Spiders are arachnids of the order Araneae. They have eight legs and can produce a silk for making nests, cocoons or webs to entrap the insects on which they feed.[302] Authors like the seventeenth-century naturalist Edward Topsel, often personified spiders, and used them to illustrate a given personal quality, or to demonstrate a moral lesson. Topsel did distinguish between "tame" or "house spiders," which he considered "gallant," excellent," and "wise," and spiders that live in holes, caves or corners, which he considered "base," "homely," and "slothful."[303] Both Topsel and Mouffet referred to house spiders as "she." They also claimed that the qualities self-evident in the manner and works of spiders were ones valued as traditional female virtues. Tame spiders are described as being quite beautiful, pretty in color and form, neat, soft and delicate.[304] In fact, both Topsel and Mouffet extolled the spider's virtues as qualities to which every woman should aspire.[305] As Topsel claimed, "The skin of a Spider is so soft, smooth, exquisite, pure, clean, and neat, that it farre surpasseth by many degrees, the polished skins of those maids that have the Greensickensse [sic], or those young whores that are so carefull in sparing no cost to preserve their beauties...it hath fingers, for all the world such as fair Virgins desire to have, that is to say. Long, round, and slender, being also endued [sic] with the most exquisite sense of touching that possibly can be imagined in so much as that it farre surmounteth any mortall man living, and all other creatures in the world besides."[306]

Mouffet and Topsel noted that some people were frightened by house spiders, or found them ugly and loathsome. They claimed that this reaction was due to the "major humor" in these people being "Melancholy," or, frankly, for no good reason.[307] They also

pointed out that history taught that those who "cast out" spiders were "naughty, unthrifty, not well in their wits and churlishly entertained her [the spider]."[308] Besides being a model of diligence and virtue, the house spider was also well regarded for its fidelity, discretion, and fairness.[309] Wherever they were found, whether in the world of the poor or the rich, tame spiders demonstrated political, civil, domestic and weaving skills from which everybody could learn a valuable lesson.[310]

In addition to the service house spiders provided for all humanity just by the example of their behavior, Topsel also highlighted their role in medicine. Spiders were used as an important ingredient in a variety of medicines, including ones designed to drive away fevers, pains in the ears, or serve as antidotes to poison. Webs were also valued for their antiseptic properties, and as a sort of matrix around which burns and other open wounds could heal more quickly.[311] Topsel reported that the mere presence of house spiders resulted in a reduced incidence of gout. [312]

Champions of the house spider are mysteriously quiet about its ability to catch potentially annoying or dangerous insects. Perhaps they felt that this attribute was so self-evident that it did not warrant their attention.[313] Alternatively, they may have been uncomfortable with the fact that this aspect of a spider's behavior was incongruous with the image of the house spider as a tame, feminine, paragon of justice, virtue and industry. After all, sucking the blood out of helpless, entangled insects could hardly be considered lady-like.

The rarity of seventeenth- and eighteenth-century references to house spiders as vermin, coupled with the scarcity of examples of strategies designed to control them,

support the view that people did not generally regard house spiders as pests. One apparent spider control strategy illustrated in an eighteenth-century children's story is brushing webs down. [Figure 4] However, the child in the illustration is actually saving a fly from a spider's web.[314] In an early nineteenth-century edition of an eighteenth-century collection of silly reversed stories, an illustration shows a young girl terrified by a spider. [Figure 5] The accompanying verse mocks the girl for being scared by such a tiny inconsequential creature.[315] Sweeping webs away targets the visible, and dust collecting webs rather than the spiders themselves. This suggests that it was prompted by aesthetic concerns about the appearance of a given room or space, more than by any inclination to destroy the spider or banish it entirely from the house.

While animals and insects have been viewed as models of human behavior throughout history, these descriptions of house spiders are, nonetheless, striking. The descriptions of the house spider found in works by both Topsel and Mouffet are in sharp contrast to the language and style they use throughout the rest of their texts. Their views were overwhelmingly positive. More significantly, they alluded to behaviors of these spiders as models for human improvement, made direct comparisons between the appearance of the spiders and women, and judged the spiders superior. They neglected to include the physiological and lifestyle details for the house spider that they included in their sections on almost all other animals. This striking divergence from their previous format and tone indicates that the spiders were not categorized with vermin or considered pests in the way other household insects and small mammals were.

Pest Control Resources

In the American colonial era, many problems with pests in the home were addressed by members of the household, particularly women. Oral traditions helped perpetuate many methods of control, especially because illiteracy was widespread.[316] However, printed resources like domestic economy manuals, newspaper reports,[317] and vermin-killing manuals also contributed to the pool of resources available to help combat pests. If they were not able to gather the ingredients and materials necessary for the control strategies they selected, women relied on other sources for their materials. Their sources included a variety of tradesmen whose businesses had a link to pest control. Among these tradesmen were, for example, cabinetmakers, apothecaries or druggists, morticians, and wallpaper-hangers.

Servants and family members often performed the same tasks related to pest control that tradesmen were, theoretically, available to perform.[318] For example, a homeowner might hire a cabinetmaker to disassemble and scald a bedframe to eliminate bedbugs, or require that the mistress of the household, a servant or slave perform the task. Depending on the resources of the household the duties were assigned to servants, children or the women in the family.[319] Regardless of whether male or female servants and children actually performed the tasks the ultimate accountability always fell to the woman of the household.

Medical historians have tracked a tendency towards self-reliance in medical matters among colonial Americans. This tendency grew in the eighteenth century and was characterized by a reliance on printed medical books for advice rather than physicians.[320] A

similar pattern of self-reliance was evident in pest control practices. Laymen, or more accurately, women, performed the vast majority of pest control tasks in the seventeenth, eighteenth, and early nineteenth centuries in Virginia rather than depending on professionals.

Many women gathered plant ingredients and other botanical materials themselves. Some ingredients were available in local stores.[321] Drugs and chemicals were expensive and could be difficult to obtain, especially if they had been imported.[322] Information about how to use these materials was passed by word of mouth, experience or through publications like herbals or domestic economy manuals. Herbals included information on the virtues of many plants and botanical materials, including their efficacy in preventing and exterminating pests or treating the effects of their behavior and bites. [323]

In colonial Virginia, the traditions of shrouding the corpse, which had originated in the twelfth century in Western European traditions, and of placing the bodies in individual coffins, which was a sixteenth-century development, were both practiced as part of the burial process.[324] Using shrouds and coffins reduced pest problems associated with corpses by screening the body and sealing it away from insects and small mammals. In Virginia, where burial often followed death by three to four days, opportunities for infestation of the corpses increased and shrouds and coffins became important for preserving the body.[325] However, neither shrouding the corpse or placing it in a coffin was as effective as embalming the corpse to protect it from deterioration.

Burial practices in Virginia were consistent with traditions from England, where people did not, in general, go to the significant expense of embalming their dead.[326] Sprigs

of rosemary were also known to have been tossed on the coffin or into the grave of the deceased in Virginia. This practice had a symbolic value of granting happiness to the living, while ensuring peace for the deceased.[327] While this plant was not generally used as a pest repellent or poison, the fragrant herb would have helped mask some of the aromas associated with death and attractive to vermin.

Women were the traditional handlers of the dead. Their responsibilities included preparing the body for burial by washing it, securing the limbs and the jaw, and shrouding it. The role of women in connection to death and burial was consistent with their skills in medicine, cleaning, pest control, and care giving. Despite the appearance of some funeral directors in major cities,[328] the dead in Virginia were most often cared for by the women among their families and friends well into the nineteenth century.[329] Death was certainly mentioned in the past, but few people went into great detail about cleaning, preparing or preserving the body. The fact that handling bodies was a female responsibility could account for it not being recorded in texts or sources authored by men. This subject has not been closely considered by scholars of Virginia colonial history, perhaps due to a lack of interest, information or evidence.[330]

Views of the world and response strategies that would be considered superstitious, or magical by some twenty-first century standards flourished in colonial Virginia. This was not unusual. Explanations rooted in beliefs that were not accepted by the scientific community are often characterized as "folk beliefs." These beliefs reflect a world view or understanding that can offer some insight into a culture group on their own terms. These beliefs can be especially informative when they address people's fears and anxieties, and

the measures they took to reduce them.[331]

Gorn and others, have argued that, in many cultures, the ambiguity and instability of life for impoverished, ill, and socially marginal people predisposed them to an increased reliance on superstition to make sense of their world. From this perspective, the political, social and physical conditions of enslaved African-Americans would encourage and perpetuate folk beliefs among their communities.[332] However, this perspective can lead to the construction of inappropriate or inaccurate hierarchies of "civilization" based on the scale established by the group in political, social and economic control of an area. In general, these scales are constructed around the knowledge and acceptance of elements of "science" and "technology" that have been established as "fact" or "truth" for the group in social, economic and political power. Alternative explanations, approaches, and interpretations of the phenomenon or events in question are often dismissed, derided, or not even acknowledged. Furthermore, the group in power will often reject any suggestion that they themselves value any ideas that could be considered superstitious. Denial of this tendency is important because it helps reduce the risk of undermining a belief system grounded in "fact" and deriving its authority from "science".

In colonial America, both men and women were involved with magic, although in general these practices were more often aligned with blacks than whites.[333] The perceived racial barrier connected to the practice of magic may in part have been a result of the fact that it was often the white community that was defining which practices were considered "magic" and which were considered "legitimate" or socially acceptable and effective manifestations of medicine, environmental regulation or prayer. Individuals identified as

"conjurers" were most often black. They were allegedly able, among other things, to afflict people with a variety of misfortunes, including infesting their bodies with vermin. By putting a victim in contact with the burnt and powdered remains of creatures like maggots, snakes, spiders or other vermin, conjurers were seemingly able to make the vermin grow, multiply, and consume the organs in their victims.[334] While some may have fallen physically or symbolically under the power of these conjured afflictions, the frequency with which many southerners, black and white, suffered from intestinal parasites would have added some credibility to the belief that somebody was capable of inflicting another with some internal parasites. Vermifuges and other remedies for intestinal worms were common. Parasites were a serious concern for many people, especially for those who lived in unsanitary crowded living conditions, for people who played or worked in sandy soils that harbored parasite worm eggs, and for those who disposed of infected human wastes in places where they could reinfect themselves or others, or who used infected human wastes to fertilize their gardens.[335]

A wide range of pests and pest control strategies developed in the colonial era Chesapeake. The impact of these pests on settlers and their responses to them were linked to settlers' expectations for the region, as well as their social and economic goals. Pest control strategies included chemical, mechanical and metaphysical remedies to regulate and eliminate vermin. Men were responsible for responding to problems with agricultural pests, while women were accountable for domestic pests in the home, outbuildings and on their family members' bodies. Each species of pests had a particular effect on settlers, and settlers developed strategies to respond to their particular predations. Women drew on

prescriptive literature, personal experience, oral traditions, and the support of professionals in fields that also had pest control concerns to address problems in their homes. A consideration of the people, fields and trades connected to pest control offers insight into the ideas settlers had about pests, the roles women had in regulating pests, and the importance of maintaining physical and social boundaries for residents of the colonial era Chesapeake.

## CHAPTER THREE
## VERMIN-KILLERS

*On the whole, if the following little Treatise, should any ways answer the intent for which it was written, the author will obtain the end he aimed at, and gratify the utmost extent of his ambition and wishes, namely the good and advantage of his fellow subjects, and the general good of the community.*

*Robert Smith, 1768*
*The Universal Directory for Taking Alive and Destroying Rats*[1]

In order to understand pest control practices and their implications in the early Chesapeake, it is important to consider the context from which they emerged and the general state of pest control knowledge with which settlers operated when they moved to the New World. Pest control has long been an important concern for human societies. This was especially true after the development of sedentary agriculture and cities in which increased populations of pests could thrive. Some of the earliest written records contain evidence of pests and pests control. Both the Egyptian Book of the Dead and the Old Testament include details about infestations and measures to control them, as do many Greco-Roman era texts.[2] The matter of who was involved in pest control in the Chesapeake region, what strategies they selected, and how the settlers' built environment affected the problem, all reflected colonists' ideas and attitudes about pests and the importance they placed on regulating them. The English in the New World based their pest control decisions foremost upon, the cultural models available to them from the Ancients through their own early modern era, and secondly, on the specifics of the

conditions they encountered in the New World. British prescriptive literature, vernacular traditions, exterminators' practices and the settlers' own personal experience all contributed to their pest control knowledge base. In the New World, Euro-American settlers also selectivly drew upon Native-American and African-American pest control strategies.

Related Professions

In the European cultural tradition there are several trades, besides extermination, with which pest control has been historically linked, or for which good pest control was an important element in its success. These professions provided some examples of pest control practices, and they contributed to the definition and maintenance of conceptual boundaries across which pests were not tolerated. One of these tradesmen was the undertaker who was concerned with mortuary practices or customs. The preservation, or stabilization of human remains prior to burial was important to avoid odors, deterioration, infestation, and the potential for disease transmission.[3] Undertakers were trained in methods of preserving human remains from deterioration and infestation.

A variety of additional, otherwise unrelated, trades were also connected to pest control. Apothecaries and druggists, for example, sold pharmaceutical products that were also used in poisons and baits.[4] In addition, prescriptive literature in health care sometimes included receipts for pesticides among their remedies.[5] Physicians also dispensed drugs and chemicals, but they do not seem to have made chemicals available for anything other than prescribed medical purposes. Settlers in the Chesapeake considered the swelling and

other effects of bites, stings and infestations on the body an aesthetic problem rather than a medical condition. Physicians seldom treated people for infestations unless the condition led to some secondary problem like infection or fevers.[6]

Other tradesmen and women that were involved in the pest control process included anyone connected to housecleaning, from housekeepers, to brush-manufacturers, and even soap-makers. Personal and household cleanliness helped reduce conditions conducive to infestation. For example, the systematic raking of debris from a yard could be more effective in regulating pests than the most toxic pesticides. Professions that involved food preparation or preservation also had a vested interest in regulating pests. Anyone working with food needed to keep pests at bay and encountered cooking ingredients that were also used in pesticides and baits.[7] This required a careful and specific knowledge, or chemical competency, on the part of cooks to avoid human poisonings.

Members of the furniture and building trades were also involved with pest control. Cabinetmakers disassembled, scalded, and fumigated bedsteads infested with bedbugs, lice or fleas. They used insect-repellent cedar in chests, dressers and drawers[8] and produced wooden fly-brush handles.[9] [Figures 6-10] Furniture makers also produced food safes to protect food from pests, and shoo-fly chairs to protect workers from flying pests. [Figures 11-12] Painters used paints, varnishes, and other surface treatments to seal and protect materials from the predations of many pests. Whitewash, for instance, contained lime that was poisonous to insects. Plasterers sealed surfaces which protected them from burrowing pests, and prevented moisture from creating conditions conducive to the survival of many pest species. Masons created structures that were less susceptible to

weather damage, rot, and pests than wooden buildings. Wall paper hangers, concerned about infestations behind their paper or in the adhesives they used, also paid attention to pest control.[10]

Upholsterers selected stuffing like horsehair for their pest prevention qualities (it was less attractive to pests that other stuffing materials). They also made feather beds with "purified" feathers, and "renovated" or cleaned up old beds. Wire makers provided materials for traps.[Figures 13-14] Comb makers made products to groom hair and remove nits. [Figures 15-17] Hairdressers and wig makers also dealt with lice. Coopers made barrels to keep provisions safe from insect and other pests. Venetian blind makers contributed to the regulation of airflow and insects. [Figure 18] Fan makers were interested in devices designed to prevent flies from settling. Tinners and blacksmiths made traps. Merchants imported traps and poisons, and carriage makers often sold fly nets for horses.[Figure 19] The models and methods in pest control demonstrated by British participants in these trades were also demonstrated by New World practitioners of the same trades. A wide array of craftsmen battled against pests in a variety of ways as part of their jobs. Pest control related employment opportunities were a significant part of the economy even when the independent business of extermination had not yet developed in America.

## Magic

Pest control practices rooted in magic and superstition were not uncommon in the Old World. They developed, in part, from a confusion or a misunderstanding about the

nature of infestations or pests' life cycles. These practices persisted because they appeared to work. Spells, incantations, and prayers apparently had a desired effect, when in fact natural population density and other regulation factors actually caused notable reductions of the perceived pest problem.[11] Even when people recognized that natural and cultural factors were mitigating an infestation, they often credited the power of prayer, or a spell with precipitating the processes that produced the desired results. The general acceptance of supernatural powers created a culture in which people did not think it unusual that science and medicine were often aligned with magic. Nicholas Culpeper, for example, a popular clairvoyant, published numerous works in medical science.[12]

Itinerant peddlers practiced a particular branch of magic in Europe. They used their knowledge of chemistry as well as their performance skills to provide a mixture of services for customers. They often also worked as ratcatchers and vermin-killers who sold medicines, salves, inks and vermin poisons. They relied on story-telling, magic tricks and juggling to attract customers.[13] They entertained and attracted a crowd with feats of magic, illusion and "legerdemain" or slight of hand.[14] These performances helped establish the peddlers as masters of manipulating objects and space, and seemingly capable of defying the very laws of nature. Having established this skill and authority, it was not difficult for performers to persuade customers that the potions, elixirs and other remedies that they had for sale were capable of producing equally wondrous results. The importance of gaining their audiences' trust was critical for these pedlars. People who were professionally aligned with both pest control and magic were often marginalized, despite the widespread acceptance of magic. There were certain risks associated with the

itinerant peddler's way of life. Vermin-killers who prepared and handled pesticides were exposed to dangerous poisons, and those who practiced magic ran the risk of being accused as witches. Furthermore, the lack of sustained relationships with customers and the temporary connection to communities these salesmen expereinced left them open to suspicion as strangers.

Given the general lack of understanding about insect and small mammal physiology and behavior, many people had a limited understanding of what caused and perpetuated infestations. In many European communities it was not uncommon to view infestations as supernatural phenomena. A remedy that had overtones of superstition, magic, or clairvoyance like those offered by the peddlers, would have seemed especially appropriate for pest control. An approach to pest control from this perspective contributed to the development of a cultural model for pest control from which settlers in the New World drew.

These itinerant performing peddler exterminators were often Jewish. Many Sephardic Jews had an excellent knowledge of medicines and poisons. In addition, in Europe, Gentiles would have allowed Jews, a culture group that many Gentiles disrespected and actively discriminated against, to enter a profession like extermination, which Gentiles abjured.[15] Some elements of the Christian belief systems and cultural practices of the Middle Ages contributed to a distaste among Christians for extermination, and an inclination to support the Jews in the profession. For example, many Christians felt that sickness and pestilence were punishments from God and could only be alleviated, or were most appropriately addressed on their part, by prayer and fasting. This left the job of

extermination to someone else. Furthermore, the idea of killing pests was complicated for Christians by the custom of admiring ascetic monks who were revered for not having bathed and for willfully tolerating the predations of body pests. Choosing to reject a trial, like body pests, that many Christians believed may have been sent by God was a difficult decision. Christians were further discouraged from practicing professional pest control themselves by the idealized view that all life was sacred and should be allowed to flourish on earth, especially since pests would not have the benefit of an afterlife in heaven that humans did.[16]

Christian views were not entirely consistent with Jewish cultural traditions in personal hygiene. Jews typically exercised a greater attention to personal cleanliness then Christians in the Middle Ages and through the early modern era. Jews recognized the importance of practicing good sanitation in connection to health, and they did not tolerate rats which they considered unclean.[17] Furthermore, they did not willfully encourage or tolerate body pests, even for purposes of spiritual enlightenment. Differences in cultural practices affected the problems and responses that people had with pests.[18]

The intersection of religion, science, superstition, and social relations represented in the person of the Old World itinerant magician, pharmacist, chemist peddlers made them ideal candidates for assuming the responsibility of providing remedies for pest control. This was especially true for members of the Christian community if the peddlers were Jewish. Eventually, the demand for information about controlling pests that these men offered resulted in the compilation and publication of their secrets in a series of "vermin-killer" manuals. Some itinerant vermin-killers certainly lost business when these

texts appeared on the market, but these books also had important positive effects for their profession. When the authors of these works revealed their trade secrets as simply carefully constructed receipts, and exposed their magic as merely illusion, many vermin-killers were protected from accusations of witchcraft. The association between magic and pest control, demonstrated by the itinerant peddlers, resulted in seventeenth- and eighteenth-century printers binding slight of hand books like Hocus Pocus with exterminating manuals like The Vermin-Killer,[19] and including information about performing illusions in some vermin killing manuals.[20]

Vermin-killing manuals became popular in London in the mid-seventeenth century. In addition to some editions being bound with magic books, they were often also promoted as examples of a "compleat and necessary family book," or a "gentleman's and farmer's guide." The authors of these books did not consistently aim the text at a gender-specific audience. They included information in these texts on both husbandry and housewifery tasks. Men could find advice about managing agricultural pests in the husbandry sections. Recommendations for handling domestic pests were listed in the housewifery sections of these texts, which confirms the impression that women were responsible for performing pest management tasks in the home.

In Medieval Europe, some men began to promote themselves as rat-catchers[21] and bug-destroyers.[22] [Figure 20] By the late seventeenth and early eighteenth centuries many rat-catchers and bug-destroyers became professionalized, meaning that they began to operate from fixed addresses, dropped some of their earlier practices (like paper-hanging or cabinet-making) to specialize in extermination, advertised in newspapers and elsewhere,

and promoted their businesses by highlighting their credentials and "secret methods" for success.[23] The religious and cultural traditions of these professionals is unclear.[24] Evidence to support the presence of professional or even itinerant exterminators in America does not appear among lists of apprenticeships, trade and city directories, court records, newspaper advertisements, almanacs, or even in personal papers until the middle of the nineteenth century.[25]

Tools and Techniques

While various tradesmen were involved to a degree in pest control, the vast majority of pest control activities that affected settlers and their homes in the colonial era Chesapeake were performed by members of the household. In his history of the pest control industry, The Ratcatcher's Child, Robert Snetsinger argued that the lack of a formal pest control industry in America, prior to the mid-nineteenth century, was closely connected to urbanization. Problems on widely separated farms could be addressed individually, but the overcrowding, sanitation problems, and building patterns that facilitated infestation in urban areas needed to be addressed in a much more systematic and direct manner.[26] An increasing awareness of the connection between some diseases and pests also encouraged the development of an extermination trade in cities. In the nineteenth century, crowded and polluted conditions in cities intensified the pest problems there and increased the overall number of pests. This affected people's ideas and attitudes about pests, producing a felt need for professional exterminators in major cities. As in Europe, men dominated the trade. Advances in biology and medicine that increased the

understanding of pests' physiology and their role in disease transmission helped align extermination with science, another male-dominated field.

However, nineteenth-century professionalization should not be conflated with the origins of concerns about pest control in America. Upon their arrival in the New World, European settlers were concerned about pests. Settlers immediately put pest management schemes into operation. The historical record for the colonial era Chesapeake provides evidence for items that were very clearly connected to pest control. Sources like account books, newspaper advertisements, and personal property inventories, provide evidence of items that had multiple uses, some of which were aligned with pest control. People bought and used brushes, fans, chemicals, herbs, soap, paint, fabric, and wire for cleaning, poisoning, repelling, or trapping.

In the American colonial period in Virginia, the presence of pests in the home reflected regional environmental conditions, standards of cleanliness, building practices, domestic economy traditions, and cultural standards or tolerances.[27] Archaeological evidence of squirrels, rats, mice, and cats in connection to domestic sites in Colonial Virginia and Maryland establishes that these species were present.[28] Some insight into Chesapeake society is available through a study of the ways in which seventeenth- and eighteenth-century settlers responded to the presence of these pests. Settlers selected methods of pest control based on the perceived threat or annoyance caused by the pests in question, the cultural attitudes towards pests and pest control as well as the models of pest control they inherited from England, personal tolerances, cultural tolerances, and the availability of techniques, material and ingredients to implement their strategies.

Pests presented a threat to food stores, building materials, clothing, health, cleanliness, physical and social appearances, social standing, gender and race relations, and issues of boundary maintenance. Often Virginians tolerated a certain population of the animals or insects as an ordinary manifestation of nature until that population multiplied out of control.[29] The point at which a population was considered unacceptable varied over time and place. Controlling pests freed people not only from the irritation and damage caused by pests, but also from the anxieties the pests' presence generated.[30] The standards of pest control also varied over time and place, and among classes and racial groups. Virginians had different priorities and tolerances that made one strategy more or less desirable than another in a given circumstance.[31]

The fact that the information about basic pest control practices that authors included in prescriptive literature from antiquity through the colonial era had changed so little over time may seem to suggest that pest control was a simple and straight-forward issue. This belies the true complexity of the problem. Some of the many remedies that were in the Greco-Roman era were still practiced in the medieval period and through the American colonial period. In fact, the use of ingredients extracted from plant material to control pests (especially insect pests), persisted well into the nineteenth century,[32] and some are still used in commercially produced pesticides. For example, materials like bay, elder, cumin, hellebore, oak, squill, cedar, and sulphur were all advocated as elements in pest control schemes promoted by seventeenth- and eighteenth-century "vermin-killers," and domestic economists.[33] Access to ingredients and materials in America, and differing overall objectives affected practices and applications.

An increased interest in science in seventeenth-century Europe led to a better professional understanding of the physiology and behavior of some pests and the potential impact of some pest control practices.[34] While colonial-era Virginians did not have access to the same sorts of technology that modern Americans do, their efforts in the field of pest control were often just as creative and diverse. Despite the range of appearances that these schemes assumed, in general they fell into three categories: strategies designed to prevent pests, contain them, or kill them. Within these categories settlers used both chemical strategies, like poisons, and mechanical strategies, like traps.[35]

Prevention was prabably the most effective pest control strategy practiced, but the least evident in the historical record. The creation of conditions that discouraged pests in the first place left no material evidence of pests and pest control devices. Furthermore, environments that were constructed to serve other purposes entirely may also have inadvertently or intentionally reduced infestation. For example, brick houses that were clean and well maintained were far less likely than deteriorating wood buildings with trash and other wastes strewn about to suffer from serious infestation. On the other hand, stockpiles of stored food and goods in the homes of wealthy planters attracted and supported more infestations than meager stores in the homes of poor tenant farmers. However, the clean, brick home's attractiveness to pests was coincidental to ulterior demonstrations of wealth, social position, taste and authority of the owner, while modest provisions incapable of supporting several generations of pests in the homes of poor farmers stemmed more from their reduced economic situation than a pro-active pest control strategy.

The historical record is not completely devoid of evidence for preventative strategies. Settlers did engage in activities aimed at pest prevention, like cleaning, using shingled roofs instead of straw which harbored more insects and rats, and constructing drainage ditches to alleviated moisture problems and reduce pest habitat. Data from probate records, account books, archaeological evidence, newspaper advertisements, and other sources testify to the presence of items like brushes, laundry soap, combs, pest-resistant hard woods, and landscape features designed to regulate moisture and other conditions that might prevent infestation. In many of these cases it is difficult to determine if pest control was the primary goal, or a collateral result of much of this behavior. However, these things did have an impact of the presence and action of pests.

The lack of a thorough understanding about the reproductive and generative processes of some pests among the general population discouraged the development of preventative strategies aimed at interrupting the pests' life cycles. In the American colonial period in Virginia, preventive schemes were the least apparent methods of pest control, and the least often acknowledged approaches to pest control in prescriptive literature and personal writings. Apparently, settlers more often contained or destroyed pests, rather than prevent them.[36]

Settlers relied on repellents to drive pests away from a designated area. Repellents did not have much impact on the presence of the pests in the first place, they simply established spheres in which the given pests were less likely to venture. Agents used to kill pests include traps, poisons, and predators. Chemical repellents like tobacco, black pepper, and lavender helped keep insects from settling in linens or cupboards. Mechanical

repellents like rat-wire helped keep rodents out of buildings, and traps could snare them if the did get in. Predators, a sort of animate repellent, like cats helped discourage the presence of rats and mice through their behavior and scent. Other sorts of colonial-era containment schemes include mosquito netting, Venetian blinds, baits intended to draw pests away from one area and into another, children or slaves assigned the task of fanning flies away from food and guests, nonfatal traps, and architectural outbuilding patterns partly intended to regulate the presence and movement of pests. Prayer and fasting were also considered viable means of pest control.[37]

Traps improved the standard of living for humans by eliminating pests and snaring game to provide additional food.. Many cultures rely on trap models that are centuries old to manage pests, and even in the early twenty-first century many people still devise their own.[38] The creativity exercised by humans in developing traps to control mice has been so remarkable, that the mousetrap itself has become symbolic of human inventiveness.[39] Information from the nineteenth century and later indicate that mousetraps are "the single most invented thing."[40] However, it was not until the last quarter of the fifteenth century that the term "mousetrap" began to be used,[41] and manuscripts and paintings documented their use. Examples include Jewish fables in fifteenth-century editions of the *Mashal ha-kadmoni* about a weasel and a mouse in which the mouse gets caught in a trap despite the advice of the weasel. Illustrations and rhymes accompanying the fable depict mousetraps. The rhyme generally translates as, "Here Mouse and Weasel together are met/And by their side the trap is set,/ Here Mouse is snared, by greed, you see:/ But Weasel goes his way, still free." The illustrations depict traps of the hinged iron type similar to those used

for bears and foxes, designed to close on the leg, wooden dead-fall traps designed to crush victims under the weight of a block or board, and cage type traps designed to trap mice live inside of a box or wire cage. By 1693 some versions of the book portray dome-shaped, barred, or wire trap. The domed wire form was still used in eighteenth-century England and America.[42] [Figure 13]

Another fifteenth-century European mousetrap imagery is found in the c.1430 Saint Joseph panel of the *Mérode Altarpiece* triptych attributed to the Master of Flémalle, Robert Campin, a Flemish painter active from 1406-1444. This painting includes two items generally agreed upon as representing mousetraps.[43] Mousetraps were generally scaled-down versions of other types of animal traps.[44] The preferred strategies for controlling mice and rats in Western cultures prior to this time were chemical rather than mechanical, and involved pesticides, repellents, and cats more so than traps or "engines."[45]

James Bateman and C. Roth felt that changes in business practices in Europe, notably the rise of Jewish trade, credit, and usury in the Middle Ages, made it increasingly important for precautions to be taken against the risk of mice invading business houses, and compromising or destroying collateral, reserves, goods, and pledges in the Jewish agents' care.[46] This could have encouraged the development of new schemes to regulate mice. The cost, availability, and risks of using chemicals, or hiring an itinerant ratcatcher in these circumstances may also have contributed to an increase in the use of traps for mice during this period. In this era, economic efficiency prompted the development of new schemes.

Particular schemes developed in response to specific pests, for example those that

repel, contain or destroy pests, reveal much about the nature of the threat Virginians felt the pests presented. Responses to rats and mice indicate that settlers wanted to eliminate them entirely if possible, but the English were aware of the risks to their health and safety that some strategies created. In his 1580 manual on husbandry and housewifery, Thomas Tusser warned readers of the dangers inherent in popular rat control schemes. He advised that,"In dairies no cat,/ Laie bane for a rat. /Though Cat (a good mouser) doth dwell in a house,/ Yet ever in dairie have trap for a mouse./Take heed how thou laiest the bane for the rats,/ for poisoning servant, thyself and thy brats."[47] Rats and mice were not a new problem for the late sixteenth-and early seventeenth-century settlers to the Chesapeake. They have been troublesome to human populations for thousands of years.[48] Cages, traps and poisons have been used since the seventeenth-century in America to eliminate rats and mice.[49]

Fatal traps of the early colonial era were designed to crush victims. Later era traps intended to drown, choke, or starve occupants. The range of traps used to control mice include "perpetual" traps, which remained permanently set and able to hold multiple occupants. Among the most popular and least expensive perpetual traps were pit-fall traps. Pit-fall traps were often simple holes in the ground, or earthenware pots sunk in the ground, with or without bait, or some other similar device intended to trap rats and mice that fell in.[50] David Drummond, an historian of science and technology, speculated that these simple pit-fall traps became less common indoors as wood or other solid flooring material replaced dirt floors.[51] One sixteenth-century perpetual trap design impelled mice to fall in a bucket of water and drown.[52] Whether this specific device ever made its way to

America in the seventeenth or eighteenth century is not clear. However, given the precedence of English practices the probability that pitfall traps were used in colonial America is very high. The use of common multipurpose items like buckets, pots, and simple holes to form these traps make identifying them in the archaeological and historical record nearly impossible without specific references describing their use. In light of this information about pit-fall traps, the presence of pits in the floors of many colonial era Virginia homes should be reevaluated, since it is possible that some may have served as traps. Some archaeologists interpret these pits as root cellars, although their specific uses and the contexts in which they appear is debated.[53] It is, of course, also possible that the same pit may have served several different functions over time.

Some slaves and poor whites who included mice and rats in their diets were also concerned with traps.[54] When mice and rats were being trapped for food, the use of traps was a safer option than poisons that might affect the people who ate them. From a twenty-first-century perspective, eating rats and mice may seem distasteful, perhaps even a marker of the most abject poverty. This is not necessarily an accurate view of colonial era practices. In an era in which the connection between rodents and disease was not entirely clear, they were perhaps not considered as "dirty" as many modern Americans view them. Albeit a strong tradition of characterizing mice and rats as deceitful and unclean helped foster a prohibition against eating them for some people. Others may have genuinely liked eating mice and rats, and they could have constituted and important dietary protein source. There may have been a cultural tradition of consuming rat meat among some economic or cultural groups.

Perpetual trap wire cages were developed in the seventeenth or eighteenth century, although they seem to be much more prevalent in the latter. Mice forced their way through a hole in the top to reach bait in the bottom. Sharp wires aimed down and into the trap around the entrance prevented them from escaping.[55] The mice could starve to death, be killed later, or even be released elsewhere. Deadfall traps for mice were generally square or oblong in shape, made of wood or other strong materials, and designed to crush mice who tripped a baited lever under a suspended block.[Figures 21-22] They had to be reset and re-baited each time they were deployed.[56] They were less effective in regulating heavy infestations than perpetual, or multiple-occupant traps. They were also not very complicated to build, and someone with very basic engineering skills could construct an effective one. Evidence for them in the Chesapeake survives in eighteenth- and nineteenth-century contexts.

Records indicate that settlers could purchase mouse and rat traps from a range of suppliers. One seventeenth-century Englishman reported that he brought a cat home for his wife to help mediate a mouse problem in their home.[57] However, three weeks later, he found it necessary to purchase two mousetraps from his cousin, who was a turner.[58] Eighteenth-century residents of colonial Virginia could also purchase traps from local merchants.[59] Local artisans and craftsmen skilled in wood- and metalworking also produced some traps.[60] Surviving colonial-era records, and surviving traps that incorporate metal gun parts suggest that some blacksmiths and gunsmiths were involved in producing traps. [61] Bateman claimed that early settlers in America brought iron and other traps with them from England, for mice and other vermin or game, and that blacksmiths

then used these models to repair, replace or reproduce the traps.[62] For a variety of reasons, including access, price, effectiveness, or personal preferences, many people probably did not rely on store-bought traps to regulate problems with rats and mice. Home-made devices and schemes, or those derived from advice manuals, could be equally as effective. Unfortunately, these remedies are elusive to trace in the historical record.

Other styles of mouse and rat traps that existed in the sixteenth through the twentieth centuries but apparently not seemingly as effective or popular were hooks, snares, nooses,[63] bows, and iron latches or spring traps.[64] Archeological fragments though to be from an iron spring trap recovered by archaeologist Ivor Noel Hume who considered them sufficiently small to have come from a rat trap.[65] Typically, spring traps are larger and intended for bigger game. A tradition of ceramic mouse trap construction exists in Northern Africa.[66] It does not seem to have been transferred to Virginia, or, alternatively, archaeologists and other researchers have not recognized evidence of ceramic mouse traps in collections, or the historical record. The same is true for "rat nets" popular in Zaire and the Ivory Coast.[67]

Much of the material drawn from the archaeological record by scholars suggests that early American remedies against mice and rats seemed to be mostly mechanical. However, this may reflect a bias of the record in which few physical examples of poisons would have survived. Advice books on vermin-killing included information about rodenticides as well as traps. Surviving information about traps is difficult to interpret because even in cultures and places in which they were known to exist, they were not often mentioned or described.[68] The popularity of traps in Virginia, and their subsequent

appearance in the documentary and historical records, probably increased in the eighteenth century in response to bounties and county requirements for trapping squirrels and crows.[69]

In addition to the poisons included in recipes to control rats, chemical ingredients in rat baits, like rhodium, aniseed, caraway oils and musks, were probably chosen because of their ability to mask human odors on traps or poisons, while remaining attractive to rodents.[70] The chemical control of rats and mice, popular since the classical era, was further promoted by the sale of commercially prepared poisons in the late eighteenth century, [71] and the relative accessibility of "rats-bane" or arsenic in the colonial era.[72]

Problems in the Chesapeake with body pests required different control strategies than those used against rats and mice. Fleas were annoying and troublesome body pests. One popular remedy was fumigation. Fumigants were typically a mixture of ingredients that, when burned, produced a toxic smoke that drove away and destroyed vermin.[73] [Figure 23] Fumigants included combinations of plants and other ingredients used to clear up the air, or the head and to destroy vermin.[74] Fumigation was also used in medical treatments. The afflicted used willow herb to drive away flies and gnats,[75] and a fern fumigant was effective against a variety of pests.[76] The risk to people from using toxic fumigants to drive away or exterminate body and bed pests was well known as early as the sixteenth century, and women were advised to watch for the dangers associated with implementing this pest control measure, most notably fire and poisoning.[77] The risk of fire was exacerbated by flammable bed curtains and mosquito netting in colonial houses.[78] By the mid-nineteenth century, the issue of the safety and health of mosquito curtains and

other bed hangings that caught fire, harbored vermin, and restricted airflow, contributed to their decline.[79]

Mosquitoes were dangerous and troublesome for Virginia settlers right from the beginning of their settlement. By seating the capital at Jamestown near marshes and stagnant water, settlers greatly increased the chances that they would be subject to mosquito stings and diseases carried by mosquitoes. In response to this annoyance some wealthy Virginians used mosquito nets as early as 1684.[80] The nets increased in popularity in Virginia and elsewhere in the colonies over the eighteenth century, primarily among the wealthy elite. Other items aimed partly at mosquito control also began to appear. Settlers used Venetian blinds to regulate air flow, light and insects' access to rooms. To prevent the damage caused by flyspecks (small dark stains caused by fly excrement), settlers protected food,[81] gilt items, mirrors,[82] paintings and engravings with gauze, and straw matting[83] to protect floors.[84] They erected pavilions, typically of gauze or net, over beds or other furniture to protect people from insects.[85] Srttlers also relied on fly lattice or fly wire (a precursor to window screens), and fly nets (intended to protect horses from the scourge of mosquitoes).[86] [Figures 3, 18, 19, 24] These items became more generally and widely available in America in the nineteenth century. [87]

In the late eighteenth century, fashion largely dictated the presence of Venetian blinds colonial homes, but they also had important and practical implications for pest control, especially when they were painted blue or green. Blue and green were popular colors for decorating in this period and they were used in paint, furniture, wallpaper, fabrics, and other furnishings. One pigment used to create blues and greens was aseto

arsenate, or Paris Green, and it was deadly poisonous. Mid-nineteenth century proponents for banning its use to color wallpapers, paints, and carpets pointed out that as it flaked or powdered out over time, it became toxic to people, pets and pests.[88]

Exactly how many, if any, insects died from tangling with the green mosquito netting that draped the Governor of Virginia's bed in Williamsburg in the 1770s, [Figure 3] or from being gathered up with food scraps in the green-painted floor cloth placed beneath the dining table during meals in Thomas Jefferson's White House will probably never be known.[89] However, it is certain that the use of green and blue paint on walls and ceilings, especially porch ceilings, was connected to insect pest control in at least two ways. First, green and blue was less reflective of light than white and therefore less attractive to insects, and less confusing to insects who maneuvered according to the position of light. These insects would be more inclined to head for the light coming from a doorway, window, or off the edge of a porch, and, ideally, fly away before they annoyed people. Second, insects who encountered the toxic residue of Paris Green in paint, carpet, textiles, wallpaper, or other furnishings were not likely to be very trouble people for very long. It is not clear how conscious most people were in the eighteenth century of the effects this pigment had on pest control, or to what extent fashion dominated their decisions to select green and blue items over any impulse to regulate insects. For the frustrated woman who reported in 1818 that, among other measures in a bedroom, she sent a bedstead out to be painted green in an effort to overcome a bedbug infestation, there does seem to be a connection between the green and pests control.[90] By the mid-nineteenth century, green was declining in popularity, and green items, like blinds were

replaced with other colors. Fashion, safety and practicality all played a role in the decreased popularity of green, especially for blinds.[91] Eventually, aseto arsenate was banned for use in dye, but it was heralded as an effective insecticide. It is still in use, primarily among professional and commercial exterminators in the United States today, and still referred to by its original name, Paris Green.[92]

The use of wallpaper as an attractive wall covering had other pest related risks with which it was associated besides the risk of poisoning from dye. It could harbor insects, notably roaches, bedbugs, and fleas. Furthermore, some insects were attracted to the adhesive used to mount wallpaper. Some women were inclined to tear wallpaper off the wall in their battles against infestations.[93]

Another fashion phenomenon that may have had implications for pest control was the popularity of caged birds in early American homes, especially among the wealthy in the late eighteenth century.[94] Some cages were used to contain birds intended to be eaten, but others were for birds that were kept and admired as songbirds or for their beautiful plumage. The cages for the decorative birds were most often suspended near open windows, often in kitchens,[95] and other areas where they could eat insects that strayed by.[96] It is not very plausible that these caged birds significantly reduced the population of insect pests (that would have had to land in their cages) in and near colonial homes. It is more probable that birds who took up residence in gourds or "bird bottles" mounted on homes and buildings had a greater impact of pest control. [Figure 25]

Bird bottles were ceramic containers set up to attract birds who would nest in them and, ideally, eat insects before they damaged gardens and entered buildings. They

were popular in England and appear in the archaeological and documentary record in Williamsburg, Virginia.[97] Dried and hollow gourds served a similar function by attracting purple martins who ate insects and drove off crows.[98] Chickens were also helpful in pest control. In addition to being driven through tobacco fields to eat worms and other insects, it was not unusual for them to be allowed to roam in and out of the house, destroying insect and other pests as they moved around.[99]

Cats were also very popular agents in pest control. They were known to have been responsible for regulating the populations of small rodents at least since ancient Egyptian times, and they were used in Europe.[100] Their presence in colonial Virginia in the seventeenth century undoubtedly helped regulate rodent populations,[101] although exactly when and how cats arrived in the Chesapeake is not clear. Certain other animals were also used to control pests. In addition to the birds housed in cages suspended near windows, even turtles were introduced into rooms to eat insects.[102] Ferrets were used to hunt rabbits in Europe, and by some professional ratcatchers in nineteenth-century Europe. They were not popular in America to control rodents in the Colonial era.[103]

Seventeenth- and eighteenth-century remedies to destroy insect pests relied predominantly on poisons. Mechanical strategies were less common, and functioned primarily as deterrents. Some chemical strategies included sprinkling tobacco around to repel moths and other insects, fumigating with sulphur to deter flies, and poisoning flies with sugar water laced with toxic cobalt.[104] Fleas were "put down" with pennyroyal, an aromatic plant also known as fleabane[105] and flies could be drawn away from a table by asparagus greens suspended overhead.[106] The variety of insect traps surviving in British

and America museums and private collections seem to be of nineteenth-century origin.[107]

Many of the chemicals and poisons used in insect baits, repellents and poisons were derived from plants. Cedar and cypress have long been recognized as effective deterrents to moths and other insects. In addition, their high resin content made these woods particularly resistant to damage or deterioration from moisture. These properties were especially appreciated in Virginia.[108] Cedar was used in furniture, chests, construction, fencing, and any other place that rot and infestation were a particular concern.[109] [Figures 6-10] From the seventeenth century on, some cabinetmakers in America lined drawers with white cedar to repel moths.[110] The oils found in cedar were also used by afflicted settlers to kill lie and other insects, as well as to drive away moths.[111]

Alternative strategies to deter insects in chests and drawers that were not protected with cedar was to line them with marbleized paper. The use of marbleized paper was a practice demonstrated by English cabinetmakers and continued in America. The paper created a physical barrier that discouraged insect pests from boring into drawers. Other strategies settlers selected included sprinkling camphor, tobacco, black pepper, herbs, and lavender to protect both the furniture and its contents against insect damage.[112]

A wide variety of plants and herbs were useful in controlling pests in the colonial Chesapeake. One way settlers learned about the properties of plants, and which plants to use for pest control was through the descriptions contained in herbals.[113] Herbals were books about plants and herbs. Some of these texts recommended that camphor and cedar be used to repel moths, and that pennyroyal could be used to repel insects of all sorts and drove off fleas.[114] Stavesacre destroyed lice and some other insects. Flies could be killed

with a concoction that included ground black pepper. Among the hellebores, stinking hellebore was also referred to as Bear's foot and is very poisonous,[115] white hellebore and black hellebore were used as insect poison,[116] particularly to destroy body pests,[117] cockroaches and beetles. Wormwood repelled black ants.[118] Tobacco, which contains nicotine deadly to most insects, has been known since the seventeenth century as an effective insecticide,[119] and was used to destroy body pests.[120] Lavender was valued for its insect repellent properties to protect linens.[121] In addition to repelling insects, lavender, which is cultivated in gardens, can destroy body pests.[122] Indian Caustic Barley, or *Cevadilla causticum Americanum*, a Mexican plant, was reported to have insect destroying properties.[123] Fleabane destroyed fleas and gnats when settlers used it as a fumigant.[124] Monk's Hood, also referred to as Wolf's bane, was poisonous to wolves.[125] Parsley seeds were used in concoctions to destroy body pests.[126] Soap,[127] Hyssop oil,[128] and Tamarisk Tree could be used to kill lice.[129]

Other plants used as insect repellents or pesticides were mentioned in herbals and encyclopedias, but did not receive the same attention as the ones listed above. Fleabane destroyed fleas but was not worthy of description in one popular encyclopedia.[130] Bugbane was listed but with a short description.[131] Another ingredient in pesticides included birdlime, which was recommended for a variety of uses, including catching mice and vermin.[132] The inclusion of lime in whitewash also made it unattractive at least and toxic at most to many insect pests.[133]

Housewives derived the chemicals used in pest control strategies themselves or purchased them from the apothecary, local merchants, or directly from merchants in

England.[134] It was important for the women responsible for pest control in the home to know the plants and chemicals used in pesticides, and how these materials reacted to each other as well as different surface treatments and materials of the vessels in which they were prepared. Several recipes for insecticides that involved dangerous poisons advised preparing the mixture in a glazed ceramic vessel,[135] which would have facilitated the thorough mixing of the ingredients that otherwise would stick to the sides of mixing vessels. In addition, it would have prevented the absorption of the toxins into porous unglazed ceramic surfaces and reduced the risk of poisoning associated with reusing the vessel for food or medicine preparation. Using glazed ceramic vessels to prepare pesticides also reduced the risk of unwanted chemical reactions that could have occurred in metal vessels. Archaeologists often recover small glazed ceramic pots in the Chesapeake.[136] These "drug jars" were delft ointment or apothecary jars that were well-suited to preparing and storing pesticides, medicines, and toiletries.

Women's familiarity with the chemicals and herbs used in pest control would also have been useful in medicine, cleaning, cooking and the many other domestic tasks that required a chemical competency. A trend towards self-treatment in medicine in the colonial era had a parallel in pest control.[137] Medicine in colonial America had a resourcefulness built out of necessity,[138] which seemed to characterize issues of pest control, too. Colonial-era women in the Chesapeake had their own experiences as well as printed resources to draw from when selecting pest management schemes. The availability of specific ingredients made some strategies more practical than others. In addition, the ultimate objective, which may have been more than simply eliminating pests, affected

women's choices as well. For example, poisoned bait might kill flies, but their dead bodies spread across the house may have been aesthetically objectionable. In these circumstances, a remedy that drew pests out of public view was preferable. The adoption of one pest control strategy over another reflected the relative importance of whatever the scheme was intended to protect. For example, in the late colonial-era royal governor's palace in Williamsburg, Virginia, gilded picture frames and crystal chandeliers were swathed in netting to protect them from damaging and unsightly flyspecks. [Figure 24] The netting would have been visible to anybody allowed in the room while it was in place. Those who saw the netting would have had their attention drawn to the fact that the governor owned valuable objects that warranted special protection, which served to reinforce his social position.

Women were creative in their selection of pest control strategies. In 1609 Hugh Plat advised women in a chapter on "Cookerie and Huswifery," that they could protect paintings from flies by draping a poisoned string over the top of the pictures to lure them off the painting itself, or to suspend a cucumber studded with barley corns to draw flies away from pictures and other hangings. [139] Not only were some furnishings at risk due to the actions of pests,[140] some furnishings, like the "shoo-fly chair," were specifically designed to help reduce pest problems. [Figure 12] Others were built with techniques that were sensitive to the climate in Virginia. Furniture and cabinet makers constructed them to be less susceptible to the splitting, warping, or peeling that the heat and humidity of the Virginia climate could cause, which made them less vulnerable or attractive to pests. [Figures 26-27] These furniture makers demonstrated a clear awareness of the climactic

and environmental conditions in Virginia.[141]

Legislative provisions at Jamestown in the seventeenth century required that bedsteads be at least three feet above the ground[142] were intended to remove sleepers from the cold and damp floor, as well as the insect, serpent, and small mammal pests that maneuvered on the ground. In the eighteenth century, patent bedsteads became popular, mostly as devices of therapeutic design, but also with some pest control properties.[143] Furniture makers constructed many patent bedsteads of metal, which was less hospitable to fleas, lice and bedbugs than wooden bedsteads.[144]

By the late sixteenth century, increasingly more people realized that personal tidiness helped prevent problems with body pests. By changing their clothes regularly, settlers removed lice and fleas living in hems, seams, and attached to coarse fibers from their human host, which discouraged their continued survival. Thomas Tusser, a sixteenth-century English author, advised women to encourage their servants to change their clothes frequently to avoid problems with lice, but warned them to be alert to the opportunities for thievery associated with their servants' frequent clothes changes.[145] Others recognized that certain fabrics and fibers were more difficult for body pests to cling to, or less well suited for attaching nits. They advised wearing undergarments made from these less "attractive" materials.[146]

Colonial-era food preservation strategies, like drying and salting, extended the life of food in several ways, one of which involved protecting it from the depredations of pests. Colonial inventories list "safes" that were generally cupboards with double doors. Sometimes these doors were made of brass wire, or a cloth screen that would have

effectively screened out many insect pests. [Figure 11] Settlers also sealed foods, particularly cooked meats, in earthenware pots with butter, oil or animal fat and then covered it with a patch of leather, a bladder, coarse folded cloth or even paper, tied to the neck of the pot.[147] Vegetables were preserved by storing them in layers of sand, or by burying them holes covered with straw. Salting, drying and hanging vegetables also extended their life.[148] These techniques made the food less accessible and less appetizing to pests and less prone to spoiling.

Architecture and Pests

Domestic pests were not only a problem for settlers and their food stores, they were also a threat to their homes. The very earliest Euro-American shelters and other buildings in Virginia were generally crude cabins, canvas tents, or sod huts.[149] Although these sorts of structures were relatively impermanent, they continued to be popular for several decades, especially during the initial months of settlement for a given individual or family. A pattern of constructing relatively crude or impermanent shelters persisted in Virginia, especially in "frontier" contexts.[150] However, by the eighteenth century, many of the dwellings had taken on the characteristics of more permenant dwellings. [151]

Once settlement stabilized, people had the time, money, and inclination to built "proper" English homes, in the English half-timber, and timber-frame building tradition. The exposed in-fill of half-timbered houses was extremely difficult to keep weather-tight and free from cracks in the New World climate. This construction method was largely abandoned by the middle of the seventeenth century in favor of ones that called for

wooden cladding or complete stuccoing, both of which completely covered the underlying form.[152] Timber-frame dwellings were better suited to the New World environment and less subject to the predations of pests than the less permanent dwellings..

Many of the timber-frame buildings had their upright support posts seated deeply and directly into the ground, eliminating the need to build expensive and time consuming prepared foundations.[153] The long-term durability of dwellings constructed in this manner was low. The in-ground posts certainly left the building more susceptible to rot and infestation than structures with stone, brick, or other more solid and substantial foundations.[154] These wood structures, often with wooden chimneys, were more susceptible to fire than brick or stone constructions, and wooden buildings with brick or stone hearths and chimneys. The dirt floors of the earth-fast buildings led to some pest problems, but prevented others. Dirt floors encouraged the proliferation of pests that thrived in soils, and they were difficult to sweep and otherwise keep clean. Wooden architectural supports planted directly into the ground were much more subject to rot and the depredations of termites than buildings with masonry foundations. Wooden floors were easier to sweep and clean, however, trash and debris could easily get trapped under wooden floors, which encouraged pests. Dirt floors allowed for the construction of a fire right in the middle of the floor to generate insect repellent smoke. Archeological, documentary, and other sources indicate that this post-in-ground construction technique for post timber houses and other buildings prevailed and persisted in Virginia through the eighteenth century, despite their susceptibility to termite damage, rot, and their unpopularity with elites like Thomas Jefferson.[155]

Settlers in Virginia came with a cultural preconception of what materials and forms were appropriate for the construction of particular structures. However, the climate, available natural resources, and objectives of the settlers all influenced the construction of the buildings they made. An awareness of environmental conditions and their effect on certain building materials was not a newly developed sensibility in Virginia. Builders in England demonstrated a keen awareness of the potential pest problems associated with certain building types, and they made alterations accordingly to prevent these problems.[156] Virginians similarly demonstrated a willingness to adapt their building forms and traditions to the new environmental, economic and social conditions they encountered in the New World.[157]

In the seventeenth century in Virginia, cooking was commonly done outdoors, at an indoor hearth, or in a basement kitchen. In the eighteenth century, as settlers grew more prosperous and more concerned with the food preservation and pest control issues in their kitchens, many settlers constructed their kitchens as a separate building, either attached or detached from the main dwelling.[158] This arrangement reduced the risk of fire damage to the main residence, removed the family from the heat and odors of cooking and food preparation, allowed for the physical, social, and often racial separation of masters and servants or slaves, and better prevented or halted infestation.[159]

The particularly hot and humid weather in the tidewater area of Virginia in the summer exacerbated issues of personal comfort, food preservation, monitoring cooking conditions, and regulating pests that thrived in the warm moist environment of these kitchens. Colonists demonstrated an appreciation of the benefits of enhanced ventilation by

building kitchens with higher ceilings and taller windows, traits seen more in this region than in other parts of the country.[160] Kitchens often had easy-to-clean brick floors in the south,[161] which helped eliminate many of the heat, moisture and pest related problems present with dirt floors.

Windows provided lighting and ventilation, but also allowed insects and other pests to enter. Glazing, oiled cloth or paper, shutters, balusters, and skins were all used to regulate the passage of air, light and pests. In the seventeenth century, window glass was becoming increasingly popular, affordable and widespread as a model of window treatments in England, Holland, and France.[162]

Chimneys are generally hollow columns of masonry intended to draw smoke and fumes from cooking and heating fires out through a controlled exit. Historically speaking, they are a relatively recent innovation, and only became widespread in English houses around the turn of the seventeenth century. In early America, settlers often built chimneys of a wooden framework coated with clay. These chimneys presented a significant fire hazard, required constant repair, and one permanent structures, they were often replaced with masonry chimneys as quickly as possible. [163] Chimneys of all sorts provided, to varying degrees, sanctuary for some varieties of pests. By drawing smoke up the vent, chimneys eliminated the possibility of using that smoke as a fumigant or repellent for pests in the building, but improved the air quality for residents.

Paneled and painted chimneypieces became fashionable for those who could afford them in the eighteenth century. However, in the seventeenth century, the walls of the chimneys and fireplaces were very often whitewashed, as were the plaster walls in the

main rooms of the house.[164] Plastering was also a way to reduce pests.[165] In some homes every surface was whitewashed.[166] The whitewash not only made a room look cleaner and brighter, but also sealed surfaces to protect them from moisture, dirt and pests, since lime in whitewash was known to have some insecticide qualities. Ingredients in many paints, varnishes and other finishes, notably white and red lead, linseed oil, and turpentine, were also toxic [167]

British printers published formal building guidebooks in the eighteenth century in England, which outlined academic and aesthetic standards for construction. Builders could draw proportions, details, and arrangements of space from these texts, but the books did not contain much information about materials, tools, or construction techniques.[168] They would not have been very useful to builders in Virginia with specific concerns about regulating airflow, providing adequate drainage, or avoiding the creation of niches or conditions conducive to infestation.

The early English colonists in the South built primarily linear plan, hall and parlor houses, or "T" houses, often one-room deep.[169] These were commonly one story, expanded by adding to the rear rather than building up.[170] This one-story design allowed for better ventilation and cooling than larger multi-storied buildings. Improved airflow and reduced temperatures discouraging pests in the home. The Hemsley House provides a good example of an early eighteenth-century building with architectural adaptions suited to, but not unique to the Chesapeake climate. The house was one room deep, had windows for good light and ventilation, a fireplace to warm the home, and a finished brick basement to provide a cool and protected storage space.[171]

The Page House in Middle Plantation, later Williamsburg, Virginia, was another Chesapeake building on an archaeological site that demonstrated architectural and landscape adaptations to the region's climate. The home was built by John Page, a wealthy and prominent planter, in the 1660s. Page used expensive ceramic peg tiles to cover the roof, contoured his brick cellar floor to direct water into sumps, plastered and whitewashed his walls, and excavated ditches to drain excess moisture away from his home, fences and fields.[172] Each of these features contributed to the preservation of the structure, and its contents, by reducing conditions conducive to both deterioration and infestation.

The roof was another architectural feature that settlers altered in response to their environment. The earliest roofs in Virginia were thatch with a steep pitch to quickly shed rain. Thatch did not survive well in the Virginia climate and it was soon replaced with wooden shingles.[173] The lack of thatchers in Virginia and relative abundance of wood probably also contributed to the decline of thatch roofs. Furthermore, thatch harbored insect and rodent pests.

Building houses in close proximity to one another also had implications for pest control. In Williamsburg, Virginia the houses were sufficiently separated from one another to allow for the passage of air. The houses typically incorporated a central passage for better air circulation in the summer. They were also often covered with insect-repellent and moisture-resistant cedar shingles, which were painted with toxic white lead and oil paints to seal and protect the buildings..[174] Virginia resident Robert Beverley explained settlers' concerns when he noted Virginians "always contrive to have large Rooms that

they may be cool in Summer."[175]

Storage pits and root cellars also had pest control implications in Virginia homes, including, as referenced earlier, their potential use as pit-fall traps. Many have been identified archaeologically. Settlers excavated a simple hole, or lined the pits with brick or wood.[176] Lining the pits improved their ability to preserve foods and deter pests. In archaeological investigations, darker soil sometimes reveals the "remnant of vertical wall boards used to secure the root storage from invasions of any animal that could get into the crawlspace under the house."[177] These pits differ from full basements and English cellars. They were smaller, impermanent, and not well-incorporated into the structure of a building. Archaeologist William Kelso challenged the view that root cellars and pits were a distinctive marker of African-American building traditions and that they could be used to identify black households. He maintained that these pits were useful in the homes of both black and white Virginians.[178] Clean or clear sand on the floor of root cellars[179] facilitated drainage and deterred some insect pests. Slaveholders were aware that root cellars existed in the homes or quarters of their slaves. They were also aware of the potential range of uses slaves could have for the pits, from storing food to hiding stolen goods.[180]

To further facilitate drainage and regulate moisture in their homes, some settlers built sumps to draw water away from the buildings. Evidence of sumps survives archaeologically,[181] as does evidence for other drainage features, like the eighteenth-century brick drain in the Ludwell garden path.[182] Archaeologists in Colonial Williamsburg have recovered evidence of fairly sophisticated systems of drains and water control features on properties in Williamsburg. They began the appear much more

frequently in the 1720s and 1730s.[183] Ditches were another strategy settlers used to control water drainage. Residents of the Kingsmill site in Virginia constructed ditches for drainage and to establish boundaries.[184] Ditches were also evident at the Calvert site in Maryland,[185] and on Jamestown Island in Virginia.[186] Ditches were intended to enclose fields and livestock, establish a boundary line, and drain water to improve conditions, but they could also exacerbate them,[187] since their effectiveness depended on their being re-dug and regularly cleaned out.[188] In 1770 a prominent Virginian, Colonel Landon Carter, had workers "scowering" one ditch for a week.[189] Settlers also used oyster shell to improve drainage and traction on high-traffic paths and in garden beds and planting areas.[190] All of the colonists' schemes to reduce moisture and standing water in and around homes would have contributed to a reduction of pests in the area.

Planters deterred burrowing pests that tried to gain access to kitchen gardens around some Virginia homes by burying vertical boards side by side in the ground.[191] Evidence of substantial fences at the eighteenth-century Burwell site suggest the Burwells had problems with larger pests, like deer, rabbits, [192] livestock, or human trespassers. By constructing secure cribs for corn and grain storage, settlers at the Littleton site in Virginia created a "dry, varmint-proof space" with a "raised and tight wooden floor" to discourage pests.[193] Even wells were used by settlers to extend the life of perishable foods and reduce their appeal to pests. Masons included a brick-lined vault in the side of a well at the eighteenth-century Bray site in Virginia to provide a cool storage place.[194]

## Native Americans and Pest Control

In addition to the mechanical, chemical, architectural and landscape strategies that English settlers in the Chesapeake adopted to help regulate pests, they also had the model of Native American and African-American strategies available to them. Despite the ongoing tensions and conflicts between Native Americans and colonists all across the New World, there is evidence that during the peaceful intervals Indians supported the colonists with food, trade, and recommendations for adapting to their new environment.[195] Alternative strategies demonstrated by the Native Americans for planting, clearing land, modes of transportation, diet, hunting, and even military tactics were all adopted by colonists. These examples suggest that colonists were open to Native American technologies that enhanced production, increased profits, improved their health and diet, made life more pleasant, increased standards of living, and otherwise facilitated their agendas in the New World. However, in the case of pest control strategies, this does not seem to have been the case. There is very little evidence that colonists were willing to appropriate the Native American pest management schemes they encountered. In addition, colonists were on occasion at a loss to understand or even recognize some Native American behaviors and conditions as potentially related to pest management. For example, Beverley and other Virginia administrators complained they found Indian dwellings excessively smokey,[196] while others established that this smoke had pest repellent properties that many Indian communities valued.[197]

Pest control schemes and living conditions demonstrated by Native Americans were closely connected to issues of cleanliness and boundary maintenance, as they were for colonists. In different circumstances over a century apart traveler Peter Kalm,

Virginian William Byrd, and some English visitors to Chief Powhatan's hut all reported that they encountered intolerable numbers of fleas in Native American camps and houses.[198] William Byrd attributed the presence of these pests to the dogs that the Indians kept "promiscuously" close and not to the Indians themselves, and noted that by retreating from the ground to elevated benches below the roofs of the huts, he was able to escape from both the dogs and the torturous fleas.[199] However, with these few exceptions,[200] early colonists did not generally use cleanliness or the presence of pests on or around Indians to characterize Native Americans. In fact, sources like travel journals, and especially captivity narratives and massacre reports that often strive to paint as disagreeable a portrait as possible of the Indians, are strikingly devoid of references to dirt, bugs, and lack of cleanliness.[201]

Three potential explanations could account for this silence. First, the Indians may have been clean, tidy, and relatively pest-free in the eyes of the colonists. Second, the Indians may have lived with pest conditions that were comparable to those many colonists endured, or, in other words "normal" conditions and not worthy of commentary. Third, failure to comply with legal, social or practical standards of "cleanliness" or "infestation" as defined by the colonists, may not, in general, have been grounds for insult, criticism or commentary. In any case, the actual presence or action of pests and other vermin among the Native Americans was infrequently noted by Europeans writing about Virginia and the Chesapeake area. However, descriptions of Native American pest management schemes were not uncommon.

The frequency of these descriptions raises the possibility that, presuming these

schemes were effective, the Indians, in fact, reduced their problems with pests, accounting for the general lack of references to pests among the Indians. These descriptions also highlight practices for which, in many cases, there were no obvious parallels among colonial Euro-American domestic pest control practices. Indians from different culture groups all over the New World, of both genders and all ages, were reported to have rubbed their skin, and in some communities, their hair, daily with grease or bear oil, either by itself or in combination with herbs, perfumes, or dyes. The colonists reported that the greases or ointments had a variety of uses, including body decoration, preservation against heat, cold, sun and other weather conditions, a skin softener, a skin hardener, and a general defense against all sorts of insect pests.[202] Robert Beverley provided a detailed description of some Virginian Native Americans' preparation and use of this ointment when he reported in 1705 that;

> "The Indians also pulverize the Roots of a kind of *anchuse* or yellow *Alkanet*, which they call *Puccoon*, and of a sort of wild *Angelica*, and mixing them together with Bear's Oyl, make a yellow ointment, with which, after they have bath'd, they anoint themselves Capapee; this supples the Skin, renders them nimble and active, and withal so closes up the Pores, that they lose but few of the Spirits of Perspiration, *Piso* relates the same of *Brazillians*, and my Lord *Bacon* asserts, that Oyl and fat things do no less conserve the substance of the Body, than Oyl colours, and Varnish do that of Wood. They have also a further advantage of this Oyntment, for it keeps all Lice, Fleas, and other troublesome Vermine from coming near them; which otherwise, by reason of the nastiness of their Cabbins, they would be very much infested with."[203]

From a twenty-first-century perspective, this seems like a sticky and stinky remedy. However, William Byrd insisted in 1728 that the ointments used did not have what would be considered a strong smell, and was considerably better than the powerfully disagreeable-smelling castor-oil plant formerly used by the Egyptians as an insect

repellent.[204] Furthermore, many contemporary manufacturers of pest repellent products still rely on slippery, greasy ingredients that inhibit insects' ability to land on and grip treated areas of skin. These greasy Indian oils very likely had the same qualities. Unfortunately, without the inclusion of some repellent ingredient in these ointments, insects can land on the edge of clothing and literally lean over the edge to bite or sting exposed skin. The addition of a variety of fragrant and potentially toxic herbs and minerals to the grease noted by observers could have rendered them even more effective at discouraging insects from biting.

Native Americans developed a variety of other strategies to regulate the pests in their fields, in their homes, and on their bodies. Many communities set up huts in their fields in which the elderly and children were stationed to scare off crows and other vermin that threatened crops. [205] Indians commonly burned brush and fields around their villages and camps to keep fleas down.[206] Some communities reportedly sprinkled tobacco around in the morning and evenings in sacrifice to the sun.[207] Nicotine in tobacco has strong repellent and insecticide qualities.

While fishing at night, some Indians in Virginia kept a fire blazing in the center of their canoes. Robert Beverley points out how convenient this was for "dazzling" the fish and allowing the fishermen to discern the bottom of the river,[208] but he failed to recognize that the smoke produced by this fire kept mosquitoes and other biting insects away from the fishermen. In their homes and outside, Indians sat on large woven mats which would have helped to keep them clean and to protect food and other items from the encroachments of certain pests.[209] Elevated benches in the interior of some huts also

moved the Indians up and away from some pests.[210] Many Native American men bathed, and the women bathed themselves and their children daily. Some men and women also shaved their body hair for "cleanliness sake."[211] Personal cleanliness has always been a good preventative and treatment for body pests.

Colonial settlers did not adopt many of these strategies demonstrated by Native Americans to control pests. Some cultural parallels did exist, such as engaging children to chase off crop predators, or sitting on chairs or, for those who could afford it, sleeping on beds that removed them up off the floor. A systematic approach to personal cleanliness and pest control demonstrated by the Indians through regular baths[212] and the application of ointments was not evident among the colonial settlers. The colonists did not follow the Indians' example of eating certain grubs and insects either, although Beverley points out that other cultures across the world did.[213] One practice that the English did pick up from the example of the Indians was dressing or tanning deer skins with deer's brains and smoke. In addition to softening the leather and making it more flexible, William Byrd reported that as long as a pair of leather breeches retained the odor this tanning method imparted, it would turn a rat's stomach and protect the wearer from stinging insects.[214]

The pest control strategies among the Native Americans that colonists described seemed to deal more with body pests than with agricultural ones. Furthermore, the strategies they described are mostly designed to protect individuals. The schemes the Native Americans selected (or that the colonists mentioned), seemed to have been available to everybody. This differed from the trend in English pest control of creating protected and unprotected spheres and regulating access to them. The Native American

strategies did not, by and large, affect mobility or activities, and it was the responsibility of adults to implement the strategies themselves. Some strategies recommended for treating cattle to repel flies in England were very similar to ones used by Native Americans on people. However, the English do not seem to have adapted their cattle protection methods for people in the New World.[215] One European traveler in the New World commented that the gifts they received from the Indians tended to be "the things they valued the most, being useful for the preservation of their lives or for the protection of their bodies."[216] This same attitude was not evident among colonists.

Certainly the English settlers in the Chesapeake were invested in protecting their health, food stores, and dwellings. However, decisions settlers made about protecting their resources were based on their own best interests, which differed from the Indians'. These interests included defining and maintaining physical, social, cultural, aesthetic, economic and racial boundaries. When the settlers made choices about pest control, they considered the impact that the pests and the control methods would have on their boundary maintenance issues. For example, settlers could have adopted a strategy Native Americans chose, like using an ointment of oil and herbs to repel insect pests that might have alleviated some physical discomfort for the settlers, but the new ingredients, odors, and behaviors might have undermined ideas about English propriety, cleanliness, civility, and cultural superiority. Furthermore, in an era in which establishing relationships and loyalties among kinship networks was critical to the literal and economic survival of Chesapeake settlers, and a disproportionate number of settlers came from or aspired to the planter gentry,[217] cross-cultural alignments, especially cultural and racial boundary crossing, did

not serve the interests of individuals or of the larger group. If Euro-American residents of the Chesapeake had been aware of the connection between pests and diseases, like plague, malaria, and yellow fever, they may have tried the Indians' pest repellent ointments to determine if at least they were effective, and developed alternative strategies for reinforcing their cultural boundaries.

## African Americans and Pest Control

Africans and African Americans were another group for whom the English settlers in the Chesapeake had to make boundary maintenance choices, and visa versa. Again, pest control was an area in which these choices could be articulated and reinforced. It is artificial in many ways to separate African Americans out from the larger group of colonial Americans and their pest control practices because these communities were intimately bound up together. However, when the issue of pest control is considered from the perspective of separate culture groups, interest groups, and status groups, particularly in relationship to pest control as a boundary maintenance strategy, the distinction between Euro- and African-American practices is useful. Furthermore, to conflate white and black schemes, or only consider blacks and their roles as implements or tools of white control strategies, would create an inaccurate view.

Enslaved African Americans first arrived in Virginia in August of 1619 when a Dutch privateer sold them to settlers at Jamestown.[218] The work force, including slave labor, quickly became an important factor in the success of the colony. One settler, John Pory, even noted that while tobacco was recognized as one of the region's riches, it was

the labor force that was truly critical to success in Virginia. He claimed that, the settlers' "pricipall wealth (I should have said) consisteth in servants."[219] White planters created a hierarchy among enslaved Africans based on their work skills. Within this imposed hierarchy slave children ranked the lowest, while adult men and women tended to be ranked according to the nature of the work they performed.[220] Until about 1730 the majority of enslaved blacks in the Chesapeake area of Virginia and Maryland were African-born.[221]

Africans and African Americans living in Virginia and America, continued to retain cultural influences and beliefs grounded in African world views.[222] Within the Euro-American and white work environment, many of the jobs in the house were gender specific regardless of race. Women were responsible for domestic chores and tasks.[223] In West African cultures, and then in the New World, women tended kitchen gardens adjoining their houses and quarters and learned gardening skills. White women were initially responsible for raising poultry, but for those who owned slaves this task was transferred to African Americans.[224] Furthermore, enslaved black women and men were often expected to develop good skills in a range of service areas both in the field and the home.[225] The overall burden of labor seemed to fall more heavily on women than men because at the end of their day slave women also cared for their own families.[226] Regardless of the task, the English settlers in the Chesapeake preferred that their slave laborers performed their jobs quietly and discretely.[227]

In this environment of mixed cultural influences and labor expectations, pest control devices and related behaviors proved to be an important and productive category

of analysis for an investigation of African-American community building practices, especially among slave populations. Pest control procedures are endowed with meaning on several levels. First, they serve as a means of preventing or reducing the presence of pests, which, in turn, reduces the irritation or threat pests present. Second, the presence of pest control devices or behaviors can reflect the conditions suffered by those with whom the devices and behaviors are associated. Third, an examination of these devices and practices provides a glimpse into the processes of cultural categorization associated with the groups in question.

As was the case among white residents of the Chesapeake, the boundary maintenance function that some pest control strategies performed for black residents of the Chesapeake was an important aspect of pest control. The range of pest control strategies with which African Americans came into contact extended well beyond the scope of practices they developed or personally practiced. They encountered the approaches adopted by members of the white and Native American communities. Whites and blacks often used pest management practices as a means of establishing social boundaries and zones or exclusion and inclusion for one another. Since African Americans were exposed to the practices of others, and objects designed and used by others were a part of their material cultural world, the alternative strategies demonstrated by the whites and their affect on blacks will also be considered in the context of this discussion of African-American pest control strategies..

A review of the environmental conditions in the Virginia and the American South conducive to insect and small mammal pests highlights the significance of pests in the

region, and the importance of control strategies in the lives of southerners. Climatic conditions in the South often lead to especially uncomfortable conditions for European settlers and African Americans alike. The heat and humidity of the summer months, although less severe than much of West Africa, was unpleasant at least and life-threatening at most, especially for those who worked outdoors all day long and for whom heat-stroke, dehydration or sun-burn were serious problems. The cold temperatures in the winter proved problematic for African-Americans for several reasons. First, planters and physicians noted that slaves did not seem to tolerate cold as well as whites. They reportedly succumbed to frostbite and pulmonary infection (believed to be caused by the cold) much more frequently than whites. While this may be true, in many cases it was probably due to inadequate shelter and infectious living conditions, rather than to the genetically different cold adaptive responses between whites and blacks (which researchers only confirmed in the middle of the twentieth century).[228]

Because southern winters rarely produced temperatures severe enough to kill most pests or their eggs, residents were subject to their afflictions year-round (albeit, with varying degrees in intensity). The warm temperatures and high precipitation levels in the South create an environment ideally suited to supporting fauna, like insects and small mammals, that are bothersome or injurious to human populations.[229] Rich forests and enormous swamps were breeding grounds for perpetual infestations, and seasonal plagues of ants, fleas, gnats, mosquitos, and rodents.

The role that pests, and the disease they often carried, had in many antebellum Southern populations takes on new meaning when pests and infestations are viewed as a

social rather than a natural phenomenon. Pest and disease conditions in the South were certainly influenced by natural conditions, but human factors were just as important since they often created pest breeding environments. Vermin proliferated in and around homes due, in part, to introducing many animals to an area, collecting rainwater and creating stagnant breeding pools, preparing and storing food in unsanitary conditions, and by strewing wastes about yards.[230] Economic and social conditions are equally important. Poverty and differential access to improved conditions or preventative strategies can combine with factors like the warm moist climate to produce a high disease and high pest environment.[231] It should also be remembered that the classification of any given thing as a "pest" is a cultural construct. The decision to identify and treat something as a pest is, in part, rooted in the impact that thing has on a given group of people. However, that impact is framed within the context of the group's needs, relationship to the "pest," and world-view. For example, whereas many modern Americans would consider lizards in their homes as pests, the interpreters in the slave quarter at the historic house site Carter's Grove, Williamsburg, Virginia, a property of the Colonial Williamsburg Foundation, report that, due to their insect eating habits, skinks and other lizards were welcome additions to the slave cabins in colonial Virginia.[232]

In addition to small mammals and insects, the environment in the South attracted European settlers who took advantage of the abundant resources in the region. These settlers imported and enslaved Africans whose labor allowed colonists to maximize their recovery of existing or cultivated resources. While some of the pests that plagued Europeans and blacks during the colonial era were indigenous to North America, others,

like bed-bugs, cockroaches, and rats were introduced through transAtlantic travel.[233] Furthermore, the prevalence of many of these pests was enhanced by agricultural, industrial and domestic practices that developed in the South.

For example, the development of large-scale farming with crops like tobacco, rice, or sugar meant that small, multiple crop fields were replaced with enormous single crop fields that attracted and supported large numbers of insects and rodents. In fact, it is not until the development of such large-scale farming schemes that infestation became too heavy to handle manually (i.e. removing insects, worms or affected plants by hand), and planters become increasingly dependent of pesticides for the success of their crops.[234] Planters who chose to grow rice constructed broad shallow marshy areas and drainage ditches that were integral to the propagation of rice but also introduced conditions ideal for mosquitos and other pests to breed. Some planters recognized that certain kinds of work in and near wet, muddy conditions was particularly debilitating to slaves. Planters acknowledged the risks of these conditions with comments like, "We have the ditchers knee-deep in water and mud. If I had known how bad it was I should not have put them to work at it but hired labor to do it," or in another case a Virginia farmer hired Irish laborers to drain a field rather than risk the lives of his slaves at such "dangerous work."[235] While these planters recognized that work in marshy areas often engendered disease, planters did not realize that in addition to the strain of the hard labor involved, it was mosquitoes infected with malaria or yellow fever that debilitated slaves.

The living and working conditions to which many African Americans were subjected were often conducive to the development of pests. Improper sanitation,

inadequate shelter and insufficient means to develop pest management strategies all contributed to the development of pests and the subsequent discomfort and danger from disease and secondary infection to which African Americans were exposed. In his study of slave health and medicine, Todd Savitt has determined that sanitation was especially problematic because biting and disease-bearing mosquitos, flies and rodents were attracted by the concentration of human beings in large slave quarters, decaying leftover food scraps strewn over yards or piled up around the yards, scattered human feces, and compost heaps.[236]

Rather than being linked to pests, disease was often linked to drafts, cleanliness and crowded conditions. For example, as late as the mid-nineteenth century one planter-physician from Georgia wrote that houses "being partially ceiled allows the cold, bleak winds of winter to rush whistling through, of which nothing can possibly be a more fruitful source of sickness and death to the African . . . I have concluded if those diseases were not propagated, they, at least, were rendered more malignant and fatal among our black population, by crowding many to sleep in the same room, and it, perhaps, in a filthy condition."[237]

In fact, very little mention is made of vermin in accounts or narratives of the era, despite the fact that disease was a significant problem. This discrepancy is perhaps due to the fact that the visible effects of a pest, like a mosquito, are quite different from the less immediately visible cause of disease, like malaria. A mosquito will cause a small, itchy red welt to rise on the victim's skin which, barring infection, disappeared in several days. Malaria produced life-threatening fevers and fatigue which compromised a slave's capacity

to work and jeopardized the slave holder's investment. Given these differences, it is not surprising that observers commented more frequently and passionately on disease than pests.

The kinds of pests present among African-American populations in the South during the colonial and antebellum periods varied over time, depending on the season, the environmental conditions of the area under consideration, the specific work environment in question, and the resources available to control infestations. Poor ventilation, lack of sufficient windows for sunshine, and damp earthen floors added to the pest and health problems by aiding the growth of fungus and bacteria on food, clothing, floors, and utensils, and the development of worm and insect larvae. Inadequate time, inlination, or access to resources to practice proper personal hygiene (baths, hair brushing and haircuts, washed clothes, clean beds) led to such nuisances as bedbugs, body lice (which also carried typhus germs), ringworm of skin and scalp, and pinworms.[238] African Americans also had to contend with mosquitoes, flies, rodents, cockroaches, and humans pests. Those living in poor, crowded conditions without sanitary facilities or time to prepare food properly suffered the most from infestations. Slaves and free blacks often fit into this category.[239]

Wherever blacks lived and worked the continuance of their good health depended largely on the conditions in and around their residences and workplaces.[240] Furthermore, since most slaves on plantations, farms and rural industrial sites lived in quarters or well defined living areas rather than independent structures removed or isolated from their neighbors (as many rural whites were), the opportunity for contagion and for disease and

infestation to spread to many people in a very short time was high.[241] Savitt has determined that what was considered a personal condition among white rural families was a matter of public health or group concern among slave groups.[242] Savitt's observation seems to be reflected in the pest control schemes many African Americans selected. While the control strategies selected by whites tended to be focused on the relief of an individual, a small group, or exclusive zone, many African-American strategies seem to be designed to address a problem for the benefit of some larger community.

From the perspective of both blacks and whites the importance of controlling pests is rooted in three culturally specific "needs:" to alleviate the physical discomfort pests cause, to affect a certain style of self presentation (i.e. welt free, not scratching, not with holes in clothing, etc), and to conform to the range of larger social ideals that are expressed through the use of pest management schemes (i.e. standards of cleanliness, views towards nature, social status, gender roles, or the capacity to control one's environment). Pest control strategies were certainly not formally restricted to any one group, but economic resources, cultural expectations, and social roles affected the methods available to blacks and whites.

Diary entries, probate inventories, personal letters, archaeological evidence and other sources testify to the presence of several devices and pest control strategies in the homes of antebellum whites. To rid themselves of the pain and welts caused by bed-bugs the most common practice was to collapse and clean the bedstead where the bugs lived with a solution of kerosene, vinegar and turpentine, or a mixture using certain boiled and mashed leaves.[243] The assaults of mosquitoes and flies on people, furniture and food were

hindered with mosquito netting, window screens, Venetian blinds, gauze armor, fans and brushes.[244] Fans and brushes were waved to swat flies away. They could be operated by individuals, or passed to servants and slaves to wave over the white individuals. Mosquito netting or pavilion gauze was used to envelop beds and cradles, or hung over furniture and food. However, these were relatively exclusive methods since the sphere of protected people was severely limited and the mobility of those under the protective folds of a net was compromised. Some people chose to swaddle themselves in netting to avoid the sting of insects but retain more mobility than pavilions allowed.[245] Window blinds or screens expanded the protected sphere to include anyone and anything in a room or building.

Settlers concocted a wide variety of poisons and potions to contend with all sorts of pests. Some of these mixtures merely drew insects away from the areas where people congregated, while others killed the pests.[246] Women left some of the pesticides in open vessels for the pests to consume, other recipes were loaded into or onto devices like fly bottles or fly paper, where pests subsequently met their fate. These potions included bait that was attractive to the vermin in question and masked the toxin, for example, wheat flour for rats, cucumbers or blood for "bugs," mustard seed or milk for fleas, and apples, lard or olive oil for lice. Popular poisons included arsenic, vinegar, salt, "lice-herb" or Staphisagria, helliberry leaves, ashes, hemlock seeds or leaves, tar, quicksilver, lye and lime. Additional pest control devices used by whites include lice combs to remove lice and nits from the head, cedar chests to prevent the infestation of clothing in storage, and smoke fumigants intended to drive out or kill pests.[247]

Scholars like Dell Upton, Frazer Neiman, and Sallie Smith have speculated on the

development of outbuildings that were separated from the main house on many southern plantations and farms.[Figures 28-30] They focused on the development and use of outbuildings for the purposes of social differentiation.[248] They suggest that an increasing desire for privatized domestic space in the eighteenth century and the increasing number of slaves in the South during this period led to the development of separate facilities for "drudgeries." Not only did such an arrangement remove potentially offensive odors and noises from the main house, it spatially articulated the social relations between masters, slaves, freedmen and servants.

Donald Linebaugh contends, on the other hand, that the development of outbuildings in the Tidewater Chesapeake region was directly related to the natural environment and its impact on the storage, processing and consumption of foodstuffs. Removing the foodstuffs from the main house was an effective way to draw away the microbes, mold and pests that were attracted to food and food waste areas. Furthermore, distance from the main house lowered the temperature of outbuildings and the main house alike, which made both less hospitable to breeding bacteria, mold and vermin.[249] Elements of both of these arguments for the development of outbuilding patterns, social differentiation and environmental control, could hold true. Just as a mosquito net functions as a device to control insects and maintain social boundaries, so too could outbuildings be used as devices to control pests by regulating conditions conducive to their survival, and as a device to maintain social boundaries set up by the different buildings.

Many African Americans in the South no doubt knew of the strategies used by whites, and were often responsible for putting them into action. Blacks' relationship to

whites' pest control practices tended to be peripheral, relative to the protection they offered. Slaves and servants were either physically excluded from the protected sphere (as in the case of mosquito netting or slaves denied access to a screened room), or they were called upon to create the protected sphere from which they were excluded (as in the case of fanning whites). In this context, many of the devices and behaviors that the whites used to control pests also served as barriers between them and blacks. While African Americans were aware of these practices they differed in several ways from the strategies practiced among members of the black community in rural Southern areas.

Many African Americans did not have immediate access to the same kinds of resources that whites did, nor did they generally have the economic means to purchase some of the devices described above. Furthermore, the construction of many slaves quarters rendered devices like Venetian blinds impractical, since blinds over the window were useless if the floor and walls had wide cracks. Even the lack of adequate clothing for slaves created conditions that made them more subject to the damaging effects of insects, wind, sun, rain and cold.[250] As mentioned above, infestation in slave quarters was a family or community problem, not an individual or personal one. As such, the kinds of strategies African Americans adopted tended to reflect a concern for group needs above a specific individual's comfort. In slave quarters cramped for space, pests became family and community problems."[251]

Like whites, blacks were reported to have cats roaming about their quarters.[252] However, the prevalence of rats and mice among African-American living spaces, and the degree to which they were considered pests is ambiguous. Savitt noted that, "In

contemporary accounts or reminiscences few planters or slaves mentioned the presence of rats, a common resident of places filthy and crowded." Despite the infrequent mention of rats among slaves, there are several references to rat bites and even such traumas as that of a six-month old male slave who was "killed by rats in bed."[253] The death of this child, combined with the frequent cases of "overlaying" or "smothering" of infant children by their sleeping mothers, raises the question of whether some small children slept with their parents or an adult to protect them from rats.[254] Such a solution to the problem of biting rats would require the assistance and surveillance of several community members.

This apparent lack of references to rats in slave quarters suggests that there were few rats among the African Americans, or that if they were present, they were not viewed as pests. JoAnne Bowen, zooarchaeologist at the Colonial Williamsburg Foundation, suggests that the question of rats among slave populations is more complicated than it might initially appear. Ongoing archaeological projects at Monticello, Poplar Forest and Mount Vernon include excavations of slave quarters. While the complete set of data has not been fully analyzed for these sites, Bowen's initial impression of the materials recovered is that evidence of rats appears in three forms: first, discarded faunal remains of other animals show evidence of having been gnawed by rats; second, bones of dead rats who apparently died on or near the site were recovered; and third, rat bones that show evidence of knife cuts or intentional breakage suggest they were killed or disarticulated by humans. Why slaves may have been cutting up rats is questionable. They may have used rats as a dietary supplement, they may have killed them because they were dangerous pests, they may have used them as bait in traps for other animals, they may have used the

rats or their bones in their ritual or religious life, or they may have used them for any number of other purposes. These suggestions do not resolve the rat mystery, but they do highlight the fact that such suggestions are no more speculative than the assumption that rats must have been a factor in the lives of African Americans (despite the lack of references), because they are presumed to have lived in filthy conditions.

The use of other animals, besides cats, as pest regulators was not uncommon among African Americans. Examples are cited above in which a lizard and a turtle were used by African Americans to consume insects. Slaves were often allowed to work small patches of land to raise crops and poultry for sale or consumption. Many masters felt this would give slaves a sense of responsibility and impress the value of property upon their minds.[255] The common practice of allowing slaves to raise, sell and eat poultry resulted in a unexpectedly high number of fowl faunal remains at some slave related archaeological sites.[256] For some slaves, chickens were a source of supplemental income and food, and they could also be important pest controllers.[257] In addition to their role in pest control as insect eaters, chickens, especially Guinea hens, served as watchdogs by screeching when strangers came near. In this capacity the hens alerted residents to the approach of human "pests." The social boundary maintenance potential of these hens was significant. [258] For some African Americans, the chicken, especially a white frizzled chicken, assumed even additional "pest control" functions.

White chickens are believed by many followers of some African spiritual belief systems to be a link between the realm of the living and the dead. As such it had special powers of communication and was able to detect and keep spirits away.[259] This was a

powerful and important "pest control" function. The frizzled white chicken was believed to be particularly adept at detecting and rooting or scratching up "nkisi" or charms intended to bring harm down upon another.[260] A common cultural understanding of what a white chicken could do is one way in which this pest control device served as a means of drawing a community together around a belief system. The presence of a white chicken was also an extension of its owner's social and spiritual boundaries.

Some planters provided mosquito nets for their slaves, but the majority of slaves had to contend with biting insects on their own.[261] Efforts to alleviate the inconveniences caused by bed-bugs, fleas, flies and lice often included hanging out blankets and clothing to air them out.[262] From this practice vermin would be blown off the blankets and garments, while many others would have dropped off in search of food. By suspending these items on lines, draping them over fences, spreading them over bushes, or laying them in a meadow, slaves may have developed one effective means of delineating the area occupied by a specific family or group. Furthermore, depending on how slaves chose to hang these items, they could have effectively prevented neighbors, the overseer, or the master from getting a clear view into their living spaces. In this situation, the pest control strategy could have doubled as an activity of social signification whereby the parameters of a given social group were established and access (physical, visual or otherwise) was restricted to specific people.

The use of bottles to entrap pests and protect people from the harm they may cause persists among white and black communities. For members of the white community, fly-bottles were intended to entrap insects and prevent them from annoying people.

Among many African Americans, bottles were used, often hung on or suspended from trees near the house, to lure evil spirits into the bottles and prevent them from harming residents of the house. Such bottle trees exist today as a means of warding off thieves, or preventing spirits from getting into the house.[263] Among blacks who accept this practice, the bottle tree stands as a kind of sentinel to protect the spiritual and closely linked social borders of a given individual or group. It is a device of exclusion and inclusion; excluding those who are bad or harmful, while letting those who belong pass freely.

Lice were a persistent problem among slaves.[264] Several observers commented that slaves were hesitant to make the effort to keep themselves free from vermin. Roger Abrahams and John Swed have reported that this kind of stereotyped argument is typical of one group trying to "stigmatize another and thus establish social boundaries."[265] Slaves for whom lice, or dirty quarters, or rats were a problem were always at risk of a typhus outbreak.[266] African Americans reduced lice by washing and blowing out infected garments. In addition, they washed and combed their hair, to the best of their ability.[267]

Another delousing activity had important social boundary maintenance implications. Apparently slaves commonly gathered in groups to remove nits and lice from one another's heads.[268] Such a practice would not only alleviate the irritation and potential illness caused by the lice, it also reinforced the family, social or community bonds that existed among the people engaged in the activity. Inclusion or exclusion from this activity would have been an effective means of establishing and articulating social boundaries.

Housing had very important implications for the health of slaves.[269] The construction of slave quarters had significant implications for the presence of pests. It

seems that one type of shelter common in Africa, earthen houses, had an important pest control advantage. Houses infested with vermin might be intentionally burned and readily rebuilt with minimum labor and expense.[270] While mud or earthen houses did exist in parts of Georgia and South Carolina, some masters showed a distaste for them.[271] Generally slave houses built or designed by masters were of English design with little evidence of African design influences.[272]

The most significant factor in housing, relative to pests, surrounded the issue of dirt or elevated plank flooring. Both seem to have had significant disadvantages. In 1822 a prominent planter commented that, "Many are of the opinion that they [slaves] enjoy more health in open temporary cabins with ground or dirt floors."[273] The penchant for living outside and having small houses with dirt floors, central fires, and few openings was part of the African architectural vocabulary.[274] A significant disadvantage of dirt floors was that were often damp and many bacteria, parasitical worms, and insect larvae thrived in the soil.[275] Dirt floors were in some cases prone to mud and mire and unhealthy conditions.[276] Furthermore, in most areas which did not have lined privies, waste materials, micro-organisms and other pests saturated the surrounding soil, including cabin floors.[277] Children playing on dirt floors were likely to ingest pathogenic organisms, get bitten by pests that carried them, or pick them up and transfer them to others. [278] Dirt floors encouraged the rotting of house planks, and low plank floors allowed trash to accumulate underneath the houses.[279] An advantage of dirt floors was that small fires on the floor (rather than on the hearth where smoke is drawn up and out of the building), produced smoke that drove away mosquitoes.[280]

Plank floors raised above the ground were believed to be better because they allowed air to circulate. Some nineteenth-century slave owners advocated quarters on raised piers for ventilation and improved health,[281] but raised floors also allowed pests to enter from beneath the house.[282] Raised plank floors were intended to be cleaner and alleviate pest and disease problems. Unfortunately, raised ones allowed for the accumulation of years of debris and filth underneath and the related disease and pest problems.[283] Recall that in the narrative of his life, Gustavus Vassa said that the houses in which members of his community in Africa slept were plastered with a mixture that included cow dung, "to keep off the different insects which annoy us at night."[284] Perhaps the practice among African Americans of allowing waste materials to pile up under their cabins served a similar purpose; maybe it was felt that it attracted insects and drew them away from the inhabitants of the houses.

To curb the problems associated with raised floors one planter suggested that, "There should be at least one raking every year, to remove the accumulations that will gather about all inhabited places, and more especially the habitations of the Negroes. These rakings should be thorough, extending beneath the houses, and embracing they yard and all its surroundings. By pursuing this course you will obtain some rich additions to your compost heap; and at the same time, you will do much towards the protection of your Negroes from disease."[285] In another case, a man, tragically, chose to burn the accumulated debris beneath his house: "An ingenious Negro. - In Lafayette, Miss., a few days ago, a negro, who, with his wife and three children, occupied a hut upon the plantation of Col. Piques, was very much annoyed by fleas. Believing they congregated in

great numbers beneath the house, he resolved to destroy them by fire; and accordingly, one night when his family were asleep, he raised a plank in the floor of the cabin, and, procuring an armful of shucks, scattered them on the ground beneath, and lighted them. The consequence was, that the cabin was consumed, and the whole family, with the exception of the man who lighted the fire, was burned to death."[286] While this case may represent an episode of familicide, that stated goal of the fire was to eliminate fleas.

Although slaves often had no choice of floor types dirt floors were very popular. This was, in part, because raised plank floors allowed cold drafts through the house and because raised floors prevented the construction and use of root cellars for the storage of food and personal property. In the name of pest control, masters reconfigured slave quarters in a manner that compromised the slaves' ability to appropriate and define a given area as his or her own space.

The practice among colonial- and antebellum-era African Americans, as well as some modern blacks, of keeping their yards swept and free from any vegetation is connected to pest control practices.[287] Yard sweeping was practiced by many African Americans as part of a practical and aesthetic tradition. Among other things, a swept yard acted as a firebreak.[288]African Americans in the south regularly swept their yards, in part to keep away snakes and insects, but also to clear a work area to do cooking, cleaning and other activities outdoors.[289] Westmacott reported that yard sweepers felt that sweeping, "helps to eliminate insects and provides a place where children can play and elders can congregate."[290] The effect of yard sweeping was similar to the effects produced by the practice of burning fields and woods to keep down pests. It inhibited the breeding and

presence of some kinds of pests, like fleas, who like grass. Furthermore, it reduced the number of hiding spaces for pests like snakes, while simultaneously revealing their presence through the tracks a snake's motion across a swept yard created.. Clearing and sweeping yards as a means of reducing pests was also a way to establish property or social boundaries, and once boundaries are established situations in which they were being crossed become more apparent. At least one nineteenth-century physician discouraged this practice on the grounds that it was unhealthy. He maintained that it was in violation of the design of nature, which was that "the earth shall be coated with vegetation," and that such conditions inevitably led to sickness.[291]

Like members of the white community, blacks found that cats could be useful in regulating pests.[292] Another strategy designed to control pests in the houses was to whitewash the quarters periodically, or paint the cracks with lime.[293] Not only did this give the houses a neat appearance, lime (which is an ingredient in whitewash, mortar and plaster used in slave quarters) has been used at least since the seventeenth-century as an insecticide. In 1837, a South Carolina planter reported that he made his slaves save oyster shells, "which they place in one pile, of which I burn lime enough each year to whitewash my Negro houses, both outside and inside. This not only gives a neat appearance to the houses, but preserves the boards of the same and destroys all vermin which might infest them."[294] The significance of this practice was enhanced for many African Americans for whom white was an important symbolic and spiritual color.

White is often used to represent the noble quality of being in close proximity with divinity.[295] In addition, white is associated with Obatala, the deity of creativity, and the

"white realm," the spirit world or the realm of the dead.[296] The use of white substances that surround homes as a "pest" control strategy still occurs today. For example, one African-American woman surrounds her yard with a line of white lime powder, a home in Orangeburg South Carolina has a yard surrounded by white pebbles, and Samuel Sutton reported that they used to sprinkle salt in a thin line around a house to "ward off quarrelin an arguin..."[297] While some of these practices were intended to deter insect pests and vermin, human pests were also included in the category of "pests" who were to be warned off by the surrounding white lines or planes.

The ability to recognize and respond to the messages being communicated with practices like this suggest a common understanding of the terms and signs involved. In that sense, this represented a community building experience through which cultural meanings were being reasserted. While these practices fostered the development of the community as a whole, they also served as a definite means of defining property and personal boundaries within the culture. Members of another culture may have not drawn the same meanings from the practices and signs blacks used, but this was largely irrelevant as these practices were used by members of the African-American community to assert their self-identity, bond as a cultural community, and define themselves in relation to some other.

The role of folk beliefs or "magic" in pest control is important.[298] These beliefs helped people come to some understanding of circumstances or phenomenon they encounter in their world. Gorn has argued that the relative poverty and lack of control many slaves experienced encouraged a particular reliance on superstition and folk beliefs

to explain and control their world.[299] Black men and women both practiced magic, but a racial barrier existed between the practices of whites and blacks.[300] Among the African-American practitioners of magic Gorn maintained that, "Conjurers were commonly alleged to know how to make loathsome creatures live inside a person. They ground up charred lizards, frogs, snakes, spiders, maggots, or other vermin, put the powder in contact with intended victims, and before long the vile beings were living inside them, growing, multiplying and eating their vitals. Such afflictions were not only potentially fatal, they symbolically rendered victims slaves to the disgusting creatures inside them."[301]

The importance of spiritual methods of pest control cannot be ignored in this discussion. In addition to the methods mentioned above, evidence exists for other practices that suggest African Americans engaged in other behaviors intended to ward off the assaults of some "pests." These activities included the construction and display or symbolic warnings or protective devices, like the "eye." A Mississippi planter complained in 1856 that unless the cracks in the walls of blacks' houses were neatly lined inside and outside, "the Negroes will soon have them filled with dirty rags, old shoes, coon skins, chicken feathers and every other description of trash."[302] This practice may have had the advantage of preventing drafts and vermin from entering the quarters. However, it may also be related to a belief that evil, or spirits, traveled in straight lines. Therefore, it was important to surround oneself with items that created interrupted patterns. For more modern groups of African Americans jumbled bits of newsprint, or magazine pictures were used to break up the power of spirits or the evil eye.[303] Forcing spirits to travel through the tangle of items the disgruntled planter mentioned might have had the same

protective value for slaves as newsprint does for later communities of African Americans. African American boundary maintenance practices are also demonstrated by the archaeological recovery of items like a silver-plated hook fastener and eye in the shape of a hand in a circle; an emblem to which some African Americans attributed protective power over witches.[304]

African American cultural traditions of cleanliness varied from those of the English. These differences, and the issue of who worked in and had control over a given space often blur issues of whose standards of cleanliness were being represented in a multi-racial household. For example, West and pan-African traditions for the use of exterior activity areas, yards or "compound" space included regular and thorough cleanings, that differed from the English patterns of disposal and cleaning. In the yards of wealthy white owners in which slaves or black servants worked, the practices of cleanliness demonstrated they were difficult to assign to one culture group or the other. Distinctive differences in some compounds made it easier to ascribe the pattern to African traditions and standards.[305] While in other areas, masters often implemented specific schedules of cleaning on their properties.[306] African women also applied their knowledge of food preservation and preparation techniques to their new responsibilities as slaves[307] and helped discourage spoiling and attendant pest problems.

Strategies used to control pests often involved the construction of physical barriers, or lures intended to draw the pest away from the community. These practices are readily transferable, literally and metaphorically, to social relations. Pest control practices can serve as a means of physically separating groups or leading them away from one

another. African American pest control practices seem to be focused on the issue of human pests (white or otherwise) in a way that is less apparent among whites. In fact, insect pests served as metaphors for human pests among slaves. "Weevils in the wheat," or "bugs in the wheat" was an expression used by slaves to communicate to one another that plans they had made for a secret meeting or dance had been discovered.[308] The major, ideological difference that seemed to exist between African-American and white pest control practices is the scope of the strategies they adopted. Many techniques adopted by whites focus on the comfort of an individual or small group, while those demonstrated by African Americans seem to be orientated towards the concerns of the larger group or community. [309]

Residents of the colonial era Chesapeake encountered some significant problems with pests. Their attitudes about who was responsible for responding to these problems were based, in part, on the model of extermination developed in England. This model included the examples set by itinerant vermin-killers, prescriptive literature, the practices of tradesmen whose jobs intersected issues of pest control, the strategies demonstrated by Native Americans and African Americans, and personal experiences. In the domestic sphere the responsibility for regulating pests ultimately fell to the women of the household, who in effect became the "vermin-killers" of Virginia.

The presence of pests in the homes of settlers was connected to the architecture and building materials used in the construction of these homes. Settlers also inadvertently created pest habitats by engaging in some activities intended to sustain themselves, like food production, preparation or preservation. Settlers used a variety of chemical and

mechanical strategies to eliminate or destroy pests. These schemes included poisons, lures, traps, physical barriers and predators like cats. While the strategies settlers elected were primarily prompted by the desire to regulate pests, many of these strategies assumed a social function as well. The lines across which the presence and activity of pests were regulated could also articulate a boundary across which social relations were regulated. The inherently inclusive or exclusive properties of many pest control strategies made them especially well-suited to supporting the definition and maintenance of social boundaries.

# CHAPTER FOUR:
# BOUNDARY MAINTENANCE AND GUARDING THE HOME

*"...ideas about separating, purifying, demarcating and punishing transgressions have as their main function to impose system on an inherently untidy experience."*

*Mary Douglas, 1966*
*Purity and Danger*[1]

Pest control is a function of boundary maintenance on several levels. Despite its many forms, effects and motives, pest control can perhaps best be understood as a system of establishing and maintaining boundaries, or a system of defining and preserving thresholds. The contemporary French philosopher Georges Bataille wrote that, "abjection is linked to the inability to assume with sufficient strength the imperative act of excluding."[2] In the colonial-era Chesapeake, women's responsibilities relating to pest control in the home were an extension of their responsibility to protect the physical, fiscal and social well-being of their families. Women's ability to exclude pests from their homes represented more than the freedom from pests' annoying behavior. It signaled a triumph over abjection and a realization of feminine ideals.

The settlers' pest control goal, however, was not to separate themselves completely from the natural world. For many people in the colonial Chesapeake, rich or poor, there were fewer physical boundaries between their homes and the natural world than Americans maintain today. For example, people used natural fibers in clothing,

bedding, furniture, and other household items. In addition, food was not processed nearly to the extent it is today and animal and vegetable products were often stored in the same space where people slept. Even clothes were dirtier.[3] Although, the settlers' tolerance levels for the presence and activities of pests differed from modern ones, standards did exist.

Bites and stings were painful, damaged goods were costly, and itchy scalps and moth-eaten clothes were embarrassing, but pests' acts of trespass threatened people on a more fundamental level.[4] The pest control practices settlers implemented were affected by the injury the pests inflicted, as well as the nature of the boundaries the pests had crossed. Colonial era civil laws regarding trespassing offer some insight into the settlers' notions about boundaries. For example, many "trespass" cases in colonial Virginia courts actually involved stolen or damaged goods, rather than simple property encroachment.[5] Part of the concern with issues of trespassing was tied up with risks of real or potential damage to property. Establishing and maintaining boundaries was important not only to exclude people or pests from a certain area, but to prevent possible damage. When pests, whether human, insect, or small mammal, trespassed it was not just a violation of space, but a threat of damage to some valuable material or social commodity. De Crèvecoeur's description of pest problems in terms of a military struggle clearly articulated a sense of a front or boundary that settlers needed to protect from pest's incursions. He remarked "Such is the nature of man's labours and that of the grain he lives on that he is obliged to declare war against every ancient inhabitant [insect] of this country."[6]

Political, cultural and racial boundaries were all carefully regulated and maintained

between the English, Native Americans,[7] African Americans, and other European groups. in the New World.[8] In order to maintain a cultural separation from Native Americans in the Chesapeake, the English imposed social and legal injunctions, including prohibitions on interracial marriages, efforts towards religious conversion, and restrictions on their mobility.[9] The English did accept some support and adopted some food and food preparations strategies early on,[10] as well as agricultural advice, but in general they disregarded many of the Native American pest control strategies.[11]

Even among themselves it was important for the English to maintain social boundaries. Wealth was not spread uniformly among settlers, and while the degree of differentiation varied over the course of the colonial era, in general, a gap existed between the wealthy and the poor. [12] This was evident, in part, from sumptuary laws and social customs that dictated the manner in which a person could present themselves to the public. These social boundaries were complicated by opportunities to acquire wealth or lose in the New World which could quickly redraw social and economic boundaries.[13] Nonetheless, overall wealth seemed to be the primary factor in determining social rank among settlers.[14] The link between wealth and heredity was detached. In this cultural climate it was important to protect resources and to avoid losses from pests because they could compromise wealth and social standing.

## Landscape Boundaries

The same boundaries that regulated or delineated zones of pest activity could also define or reinforce spheres of human interaction. Fortifications, landscape features and

property lines were the most obvious of these boundaries.[15] The walls of the fort at Jamestown, constructed in 1607, were one of the first physical barriers the English built in Virginia. In 1608 a second fort was built across the James River as a retreat, the so-called Smith's Fort. Ostensibly built to protect settlers from the Native Americans and other Europeans seeking territory in the New World, the forts also protected settlers from the predations of wolves, in later years, scarcely domesticated livestock when they arrived, and other pests. Access to the forts was regulated. Administrators even attempted to restrict the impact of disease on settlers within the walls of the Jamestown fort by regulating waste disposal and other unclean activities in the fort.[16] The substantial fortified walls made a clear statement about the settlers' intent in the region; they planned to stay.

However, the protective fort walls restricted only some pests' access. Insect and small mammal pests like cockroaches and rats depleted food stores and those like termites compromised the integrity of the walls themselves, which made the fort less useful for retreat, defense and protection.[17] The damage caused by pests to food stores and crops compromised the very success of the colony.[18] Despite the seriousness of the threat to success that pests presented, lists of necessary provisions suggested for families traveling to Virginia did not include any clear-cut examples of pest control devices or literature.[19] The English no doubt imagined that barriers, like forts, between them and human threats to the success of the colony would be adequate.

In addition to forts, the English also constructed a six-mile-long trench-set palisade, or substantial fence, completed in 1634. It stretched across the peninsula between the York and James Rivers, near the area the English first settled at Jamestown.

This was an unambiguous boundary line for the English, unlike some of the Indian's landscape modifications which were not entirely understood by the English.[20] The palisade separated the southern portion of the peninsula from the northern, provided a protected area for refugees from the north in times of danger,[21] and secured an area of safe, free range for retrievable livestock.[22] Settlers constructed houses along the palisade at intervals in order to monitor it and protect it from Indians.[23]

The palisade proved to be more of a conceptual boundary than a physical one. From the time it was constructed Euro-Americans lived on the northern or exposed side of the palisade. Furthermore, it only posed a slight obstacle, easily crossed by determined people, animals or pests. In this case, the English used a physical boundary to articulate a cultural one. It stood as a symbol of their claim to territory without actually bounding it in a way that prevented physical access. For much of the seventeenth century in Virginia, property boundaries were demarcated with similarly impermanent or mutable markers, like trees, creeks, or other natural features. This resulted in neighbors regularly encroaching upon each other's land,[24] and required diligence on the part of property owners to maintain the integrity of their property lines.

While it may, incidentally, have served as a defense mechanism, the palisade really expressed the expansionist mode of English thinking about Virginia that was developing.[25] The palisade signaled that the perceived threat from human transgressors to more discrete zones of settlement had stabilized and that the boundaries of these zones were largely believed to be secure. This allowed settlers to simultaneously expand, and refine their sense of the boundaries in need of protection. Settlers shifted their attention to matters of

boundary maintenance and pest control within their own properties, homes and bodies.

Planters regularly excavated ditches to delineate property lines.[26] The ditches sometimes paralleled fence lines.[27] The ditches helped drain of the fields which improved agricultural production and conditions for livestock. In addition, by controlling water, they helped to reduce conditions conducive to the development of many insect pests. By regulating moisture levels the ditches also helped extend the life of adjacent fences by curbing rot and infestation. A further pest control function of the ditches was to prevent the egress and ingress of cattle. Ditches, especially in combination with fences, also performed an important social boundary maintenance function by serving as efficient visual cues and physical obstacles to potential human trespassers.

Before 1642 legislators in the Chesapeake area required settlers to fence in their crops and fence out livestock that were allowed to roam free. The split-rail zig-zag fences developed in the Chesapeake and later adopted elsewhere in America required a lot of wood and space, but those were sufficiently available. More importantly, these fences did not require much skill or time to built, they were portable, and sturdy.[28] People also learned that some fence materials were more durable than others and preferred them for construction.[29] The responsibility fell to individuals to protect their own property rather than on the farmer to control the wanderings of his animals. This would have contributed to the development of a sense of boundaries and the individual's responsibility to maintain them, or be liable for the consequences.

In the landscape of the colonial Chesapeake, walls, hedges, and hahas (sunken moats, ditches, fences or walls intended to create a boundary without obscuring a scenic

view) served similar pest control and social boundary maintenance functions as ditches and fences did. In addition to creating a physical barriers to the passage of larger pests and people,[30] property owners used walls, hedges and hahas[31] to signal a restricted access area. They could also be decorative and provided increased privacy. Property owners established tolerance levels for these zones and granted permission to enter the space according to kinship, race, gender, socio-economic status or other criteria. [Figures 29-30]

English boxwood hedges had an even more direct role in pest control. They set up a physical barrier that slowed the advance of people and certain pests. More importantly, they emitted a fragrance that was repellent to certain varieties of insects, and were unpalatable to deer.[32] The resources to afford the hedges, the knowledge to cultivate and train them into the desired patterns, and an awareness of their pest control properties encouraged the use of English boxwood in the creation of zones of inclusion or exclusion, in the yards and gardens of prominent colonial Virginians. The boxwood hedges created a zone in which issues of boundary maintenance relative to pests, social standing, economy, and the natural environment all converged.

Architectural Boundaries

Within colonial Chesapeake homes, floor plans also affected pest control and boundary maintenance issues. The room use, materials used in construction, air circulation, and the moisture and temperature levels in homes all affected the pest environment, and the way in which people moved in, around, and between the buildings.

These same factors also reflected information about the economic and social standing of the residents. English colonial houses in America were traditionally directed inwards, with few external doors, and internal halls and stairs to move from room to room. This contrasted with French colonial houses in America that were directed outward with multiple exterior doors and stairways on exterior porches, a lack of hallways, and rooms that opened directly into one another.[33] The implications for boundary maintenance in these models were significant. The tightly defined English model has a greater physical capacity for exclusion of pests and people. Zones could be more closely monitored and regulated in the English model. In the French model, movement is more fluid, and less regulated, ultimately making the house move vulnerable to incursion, pest or otherwise.[34]

In general, seventeenth-century English homes in the Chesapeake were built in the hall and parlor model. In the early eighteenth century, the hall and parlor folk tradition, exemplified by Solitude in Charlottesville, was at one end of the architectural spectrum, while a a later formal academic style with neoclassical influences, exemplified by Thomas Jefferson's Monticello, also in Charlottesville, was at the other.[35] Most of the plantation great houses in eighteenth-century Virginia fell in between these poles with the Georgian model. A Georgian house was typically a two-story brick building with centrally located doorways and architecturally balanced or symmetrical, chimneys, windows and other details. These Georgian homes were similar in style and floor plan (but not scale), to the Governor's Palace in Williamsburg, Virginian. Larger houses were generally flanked by dependencies and sometimes geometric gardens, often situated on high ground so as to visually dominate the landscape.[36]

Homes constructed in the Georgian style would have had several pest control related advantages. The site, on high ground, tended to be drier and breezier which discouraged pests that liked moist environments and insects like mosquitos that could not tolerate breezes. Furthermore, the symmetrical window and door arrangements allowed for more efficient airflow throughout the building, which kept it cooler, drier, and therefore less hospitable to pests. By constructing outbuildings and removing some household activities from the main residence, settlers were able to more efficiently regulate temperature, moisture, infestations, and people in these spaces.[37] [Figures 28-30]

The conversion of the Calvert house in Annapolis from a hall and parlor plan to a Georgian-style house, with dependencies and garden provides a good example of this shift and the resulting reorganization of inclusive and exclusive spaces, or protected and exposed zones on the site.[38] The new Georgian configuration allowed for more direct physical and environmental control of the spaces, and the movement of people and pests through them. Room uses in the eighteenth-century Georgian style homes were also more sharply defined than in many seventeenth- and early eighteenth-century homes. Seventeenth-century rooms had multiple uses and were not as identifiable by the activities that occurred there, or as restricted in uses as they came to be in the Georgian period households and floor plans.[39] More narrowly defined room uses allowed settlers to regulate activities and occupants more closely. Some Virginians modified their homes with a seeming symmetry from the exterior, but kept an unsymmetrical floor plan inside. This would have reflected their awareness of the newer architectural trend, and desire to project a more elite social and economic standing than the traditional hall and parlor

homes,[40] but it would not control pests or maintain social boundaries like a more symmetrical Georgian-style house.

In their studies of colonial America, James Deetz and Richard Bushman argued that this change in house styles was an outward reflection of the settlers' personal, inward changes.[41] Bushman explained that settlers "wished to transform themselves along with their environments."[42] He roots the transformation in aspirations towards refinement and gentility among settlers beginning around the turn of the eighteenth century. The settlers' aspirations contributed to changes in their speech, dress, body carriage, manners, and material world, as well as their houses.[43] By the end of the eighteenth century most middle-class settlers felt they should live a genteel life. A century earlier, most settlers had not presumed to emulate the manners or possessions of a gentleman.[44]

In many Chesapeake homes doorways were a primary point of access for insects, small mammal pests, and human pests. The use of locks and keys were a tangible and definite way of regulating access to people and some pests. Decorative motifs on locks and lock plates also contributed to the perception of a social, political, cultural or wealth status that further reinforced the barriers in question.[45] Keeping areas and objects secured, even under lock and key if necessary, was often the responsibility of the housewife.[46]

The threshold was an especially vulnerable place because some settlers believed that evil spirits gathered there that had the potential to harm occupants of the building. For women during the colonial era within the domestic sphere, protecting the actual threshold of the home from the predations of pests included monitoring for spiritual pests. The English developed several household superstitions and customs, like mounting horseshoes

over a doorway, to protect people from these intruders.[47] Even within the Euro-Christian culture of Virginia, it was important for settlers to maintain a separation between themselves and spirits. For example, the wealthy often provided their children with coral pacifiers, or beads dusted with coral powder to alleviate the pains of teething, as well as to protect the child from malevolent spirits.[48] Insects, like the death-watch beetle (a harbinger of misfortune), or the cricket (a sign of good luck), could reflect spiritual and superstitious beliefs.[49]

Inside, some residents of the Chesapeake used barriers to block the advance of pests in their homes. Wire screens, mosquito curtains, and Venetian blinds all restricted pests' access to designated areas.[50] [Figures 3, 18, 24] Women also used gauzes, or cloths to cover foods in the colonial era.[51] These devices also helped to preserve the appearance of the rooms, the furnishings, the food, and the occupants by shielding them from the predations of pests. The larger devices also provided an increased element of privacy for those settlers concealed behind them. Moreover, they reinforced social boundaries first by asserting the taste and wealth of the settlers who used them and second, by contributing to the creation of human zones of inclusion and exclusion. For example, a planter who draped his bed in mosquito netting or who sat to work beneath a mosquito netting pavilion established a physical boundary between himself and biting insects, while simultaneously articulating a social boundary between himself and those who were not welcome to share the protection the netting offered.

Social Boundaries

Settlers relied on each other's reactions to pests, in addition to pest control strategies, to help refine social boundaries. "Good manners" dictated appropriate responses to pests. Among the genteel (or those aspiring to gentility), a particular set of manners was considered essential. Over the course of the eighteenth century, standards for behavior previously applied to the gentry were becoming more popular among the middle class.[52] Courtesy books and etiquette manuals began to appear more often in America in the early eighteenth century, and they gained popularity over the century.[53] A code of manners became a class marker in a society where wealth no longer clearly established position. Translations of one sixteenth-century etiquette guidebook, Monsignor Giovanni De la Casa's Galateo: Or A Treatise on Politeness and Delicacy of Manners, Addressed to a Young Nobleman, were used through the late eighteenth century.[54] De la Casa felt that bad manners were not only impolite, they also made a person look ridiculous.[55] He reminded readers that in many cases manners or good behavior were conflated with moral behavior, and that breaches of etiquette had moral overtones.[56] Within the guidelines of proper etiquette for some settlers, poorly mannered people could be considered pests themselves for their annoying and distasteful behavior.[57]

For those settlers who accepted these rules of behavior, scratching oneself at the table, whether from a bug bite or other cause, was considered very rude.[58] John Garretson advised readers of The School of Manners, that it was unacceptable to touch any part of the body that was usually covered.[59] This prohibition precluded scratching most bites, or picking insects off most parts of one's body in the presence of others. George

Washington reiterated the importance of manners connected to problems with body pests, and provided some insight into the physical conditions in which people lived when he copied this advice into his commonplace book around 1740: "kill no Vermin as Fleas, lice, ticks, &c in the Sight of Others."[60] In his study of manners in America, Gerald Carson reported that personal untidiness or slovenliness was also viewed as poor manners.[61] However, the issue of responding to the discomforts caused by pests was not addressed at length in most colonial-era guidelines.[62] The basic guidelines of colonial era etiquette manuals were to respect rank, exercise bodily restraint, and demonstrate a regard for others' feelings.[63] In general, specific instruction linked to pest control included prohibitions on scratching, and advice to keep clean.[64]

The responsibility for teaching and enforcing good manners in the Chesapeake typically fell to the women in the household, and occasionally to male schoolmasters.[65] Mary Cable, an historian of American manners, claimed that lessons derived from manuals of deportment were unnecessary in seventeenth-century America, where most people would have had few opportunities to demonstrate their grace and gentility.[66] She is dismissive of the fact that standards of behavior and interaction existed among members of all cultures. Although these standards may have varied between socio-economic classes, wealth did not connote the practice of the only set of manners available. Settlers in positions of wealth and power may have decreed that the version of good manners which they endorsed was the standard to which everybody should be held, and that those who acted differently were unmannered. When individuals intentionally or carelessly behaved in way inconsistent with the guidelines generally agreed upon by their peers as appropriate in

a given context, then they can be truly said to be acting with bad manners.

The abundance of land in the New World made it difficult to establish a permanent upper class in Virginia, since people moved through the social scale more easily than in England.[67] Settlers' knowledge and practice of good manners, including their responses to pests, played an important role in helping refine and reinforce social boundaries in an era when a person's material possessions might not reflect his or her social standing. The standards of behavior followed by many Americans were generally drawn from English precedent and publications.[68] Social aspirations and expectations made etiquette manuals popular in the libraries of Virginia's social elite. George Washington, Thomas Jefferson and Benjamin Franklin relied on The Whole Duty of Man for advice on manners.[69] Publishers also produced popular titles specifically designed for women.[70]

In addition to the challenges that pests presented for settlers trying to display good manners and the damage they caused to food stores and structural materials, there was also a cosmetic or aesthetic component to pests' behavior. Pests affected a person's personal appearance with bites and welts, damaged clothing, and compromised the look of a room or house. Pests that crawled into settlers' ears while they slept might further affect a person's appearance by interfering with their sleep.[71] Appearance was an important issue for many people.[72] The existence of receipts for creams, powders, and elixirs to clarify the skin, hair, scalp[73] and teeth indicate that some people went to considerable lengths to improve their appearance.[74] Some of the settlers' attempts to regulate pests or eliminate them from homes were motivated by the effect the pests had on physical appearances, particularly when issues of personal appearance factored into concerns about social status.

However, among the English in the seventeenth century, even members of the social elite were generally dirty and often verminous.[75]

The English who could afford them preferred silk and linen undergarments because the fabric was smooth and the fine fibers of these textiles were less liable to harbor lice than wool, and were less well-suited for the attachment of lice eggs or nits.[76] In his domestic economy manual, Markham reminded women that their obligations extended into this area as well when he stated,

> Our English Hous-wife after her knowledge of preserving and feeding her Family, must learn also how out of her own indeavours, she ought to cloath them outwardly and inwardly for defence from the cold and comlinesse to the person; and inwardly for cleanlinesse and neatnesse of the skin whereby it may bee kept from the filth of sweat or vermine; the first consisting of woollen cloth, the latter of linnen.[77]

The ability to afford some pest control-related goods and materials not only improved conditions for the wealthy, it also had the potential to increase the injury, annoyance or risks for those less fortunate. For example, servants or slaves who were required to fan insects off others, secure a mosquito netting pavilion for its protected occupants, or prepare and apply toxic pesticides were at a greater risk of illness, injury, and annoyance than their masters were.[78]

Eighteenth-century Chesapeake settlers who aspired towards gentility made the architectural shift from the hall and parlor model to the Georgian model,[79] and increasingly stressed "proper" etiquette also became more concerned about appearances.[80] Bushman claims that this concern developed into a "beautification campaign," where everything, including people, behaviors and material surroundings, was required to be aesthetically pleasing while also being subject to constant criticism. The settlers' criticisms of one

another perpetuated cultural and social divisions in the colony. Those for whom refinement was important depended on luxury items and elements of the material world as props on the stage of their genteel performance,[81] and to distinguish themselves from the un-genteel. In this cultural climate Bushman maintains that "refinement created a standard for exclusion as well as a mode of association."[82]

Pest control devices and strategies were ideally suited to this eighteenth-century culture of refinement. Evidence from the historical record reveals an apparent increase in concerns with regulating pests, their activities, and their effect on appearance and social standing. References to pest control devices and remedies among the elite increased in probate records, personal papers, domestic economy manuals, periodicals, and advertisements over the course of the eighteenth century.[83] Pest control strategies contributed to the settlers' maintenance of certain appearances, they helped people protect goods and materials from being compromised, and they supported the creation of physical and social zones of exclusion. Bushman recognized that improvements in personal appearance, standards of cleanliness, and standards of living among the upper and middle classes were a part of the refinement process, but he did not include any reference to pests in his study, or any references to the role that pests and pest control played in the establishment and maintenance of boundaries among the genteel.[84]

## Women in the Home

Among the Euro-Americans from more prosperous families in the Chesapeake, the responsibility for keeping a home looking genteel, and for pest control in the home in

general, fell to the women of the household. Pest control was one extension of women's roles as guardians of the house, family, and their bodies. Women were responsible for protecting against any of the physical, social, and economic depredations caused by the activity and appearance of pests in the home.[85] This responsibility represented more than a simple element of domestic economy or good housekeeping skills. As it developed and increased in importance in the seventeenth- and eighteenth-century Chesapeake, pest control embodied women's identities as protectors and keepers of the physical and social boundaries in the home.

Domestic economy tasks have historically been the responsibility of women in English families, and in other culture groups, and that tradition persisted in the colonial era in Virginia.[86] The variety of activities that were encompassed in "housewifery" extended well beyond cooking and cleaning and varied by class and race. In general housewifery included contributing to the agricultural labor force, cooking, cleaning, gardening, keeping the poultry and dairy yard, making clothing and linens, preparing medicines and caring for the sick, [87] doing laundry, making soap and candles, preserving fruits and vegetables, collecting water, leading children's religious instruction and occasionally teaching reading and writing. Urban housewifery was not fundamentally very different from rural.[88]

Some travelers have remarked that, historically, Virginian women distinguished themselves as exceptional housekeepers,[89] while others have noted that given the labor-intensive nature of tobacco, Virginia's staple crop in the colonial era, there was very little time for much attention to domestic economy.[90] This distinction likely reflects a variation across classes. Despite English traditions that agricultural labor was for men, and domestic

responsibilities fell to women, in Virginia women did work in the fields.[91] Regardless of the level of attention women were available to give to housework, Caroline Davidson reports that for many English women in the seventeenth and eighteenth centuries, housekeeping was very important and value laden work. Many found housework rewarding, creative and satisfying.[92] However, housekeeping was often connected to a degree of servility that, for some colonial era women, was unacceptable.[93]

Some young girls enjoyed playing at the tasks of housekeeping, including pest control.[94] [Figure 4] It is not uncommon for play to teach and reinforce culturally prescribed roles as part of the socialization process for children.. Play could function as practice for the activities that even children recognized as important and valued in their communities according to their gender and social positions. Seventeenth- and eighteenth-century girls were trained to recognize housekeeping tasks as their natural and very important work to which they should devote all their physical and mental energy.[95]

Although few women read domestic economy manuals themselves, they would have been familiar with the traditional and folkloric accounts these manuals advanced about proper roles for women, and the social responses or repercussions for women who violated these roles.[96] Oral traditions not only contributed to the content of many of these manuals, they helped to perpetuate the views and attitudes and practices prescribed in the books.[97] In the mid-seventeenth century, Gervase Markham, reminded readers of his domestic economy manual that "our English Hus-wife must be of chast though, stout courage, patient, untyred, watchfull, diligent, witty, pleasant, constant in friendship, full of good Neighbour-hood, wise in Discourse, but not frequent therein, sharpe and quick of

speech, but not bitter or talkative, secret in her affaires, comfortable in her counsels, and generally sklful in the worthy knowledges which do belong to her Vocation."[98] Women were reportedly embarrassed and dishonored by evidence of their failings in housekeeping. A late eighteenth-century article claimed that a good wife and mother "is not ashamed of a trifling darn, or a small patch, but esteems a ragged coat on her boy a libel against herself."[99] An untidy house also compromised the ability of families, even of modest means, to be hospitable to visitors.[100]

The risks of failing in their housewifery duties were more serious for women than the simple embarrassment of, for example, an untidy kitchen. Women were often characterized as "good" or "bad" according to their skills in household management. In her 1996 study Good Wives, Nasty Wenches, and Anxious Patriarchs: Gender, Race and Power in Colonial Virginia, Kathleen Brown found that in the seventeenth century "Idealized depictions of domestic good wives and property-holding patriarchs, meanwhile, were fast becoming the mainstays of English imperial identity."[101] This held true even in circumstances in which the women did not do the physical labor themselves. Wealthy who hired servants or owned slaves were nonetheless also expected to be perfectly familiar with all the aspects of running a household.[102] A woman's good effort or sincere attempt in domestic economy was not adequate: she had to be good at it.[103] Domestic economy was connected to the smooth management of the home, health, and respectability.[104] Women were expected to be good-natured and to demonstrate a model of industry, piety and skill.[105] In fact, Gervase Markham made it clear in his seventeenth-century manual on domestic economy, that a woman's inability to perform her domestic duties well broke her

marriage vow in which she promised to love, cherish and serve.[106] Men also had certain responsibilities connected to maintaining the home and family, which included selecting a prudent, cleanly, and virtuous wife.[107]

Administrators in the early days of Virginia were very concerned about the "quality" and training of the women who came to Virginia as wives for the male settlers. They felt that the colony's succeess was closely connected to having women available to cook, clean, nurse, and otherwise support the industry and economy of the men.[108] The view among settlers and administrators that social evil was rooted in the impact of unruly women and disorderly households was strong.[109] The climate, resources and competing demands for time in colonial Virginia continually challenged women to keep a home clean.[110]

Cleanliness was appreciated for the effects it had on the comfort of one's home, health and politeness.[111] Biblical injunctions that it was a woman's moral responsibility to maintain high standards of cleanliness were reiterated in domestic economy literature from the seventeenth century through the nineteenth.[112] Standards of cleanliness existed among settlers of all classes. Brown points out that, "although a wife's cooperation was necessary to making guests feel welcome, in Byrd's view hospitality reflected differently upon a woman that it did upon a man, revealing her proficiency at domestic tasks that the architecture of plantation mansions normally rendered invisible." "Cleanliness, sweet-smelling bed linen, and an abundance of fine food at the table revealed to visitors a plantation mistress's good character, even when such tasks were clearly being performed by female slaves and servants."[113] In addition to cleanliness, in many parts of America the

absence of fleas, bedbugs and other pests was viewed as the hallmark of a good hostess.[114] Some travelers suggested that the presence of pests represented poor housekeeping skills.[115]

The most popular methods of cleaning house in the seventeenth and eighteenth centuries in America on which women relied were sweeping, and rinsing with solutions of lime water.[116] Colonial-era merchants in Virginia advertised cleaning products like borax, sal ammoniac, alum, ox-gall, polishing powders, pumice stone, rotten stone, brushes and brooms of all sorts.[117] General cleaning strategies were coupled with specific remedies for specialized cleaning circumstances.[118] Whitewashing was another way of improving the appearance of cleanliness in the home. It was also largely women's responsibility.[119] One author, Caroline Davidson, determined that even if their goals were not attainable for financial or other reasons, most people aspired to cleanliness of their persons, clothing, objects and environments.[120] By the late eighteenth century in the Chesapeake, for many settlers all aspects of housework took on new political, social, economic and other important meanings, which fostered a new attention to domestic economy.[121]

Since cleaning was not allowed on Sunday, and Saturday was generally a busy cleaning day in preparation for the Sabbath.[122] Despite the social and cultural pressure to maintain a certain standard of cleanliness in their homes, some women's efforts were not always appreciated, as the author of this poem suggested.

> My wife's of manners gentle, pure, and kind,
> An honest heart - a most ingenious mind:
> Beauteous and gay, domestic without vice;
> And but one fault - indeed she's over nice,
> Mops, pails, and brushes, dusters, mats, and soap
> Are sceptres of control - her joy, her hope.

Each day we scrub and scower house yard and limb,
And on Saturday, ye gods, we swim![123]

Taxation, guilds, and other monopolies were obstacles to cheap commercial soap manufacture. Soap was typically made in the home from wood ashes and animal fats when they were available. Urine, and even dung (the ammonia in which served as a bleaching agent) were also used as ingredients in soap to clean clothes.[124] Over time, water systems improved, soap usage increased, and people began to appreciate the health value of bathing.[125] Technological advances, like the cheap production of sodium bicarbonate, also contributed to the increased availability of soap.[126]

The issue of cleanliness in the Chesapeake was complicated by the fact that in the seventeenth century, many people associated suds with the plague. Early health ordinances at Jamestown forbade throwing soapy water into the streets on the grounds that in London it had been noted that washerwomen and those aligned with the soap industry died from the plague.[127] While the use and production of soap in Virginia does not seem to have been restricted by fears about the plague, concerns about the safe disposal of suds and soapy water did prompt regulations. By intervening in matters related to cleanliness and waste disposal at Jamestown the state contributed to the reinforcement of social norms. The elite English in the Chesapeake expressed their notions about ideals of cleanliness, ostensably for the benefit of the entire community, in the form of legislature. Waste and pest control related public health ordinances, bounty programs, and fencing or enclosure acts bound the settlers together around a common goal of financial, social, physical and colonial success.

Standards of cleanliness applied to women's personal appearance as well as their

homes. Standards varied over time and were connected to ideas about health, appearance, religion, and gentility.[128] John Adams demanded of his daughters in 1761 that in addition to kitchens and parlors they keep their, "Teeth, Necks, Hair, Perspirations, and Respirations" clean. He even claimed that "My own Daughters, whenever they shall grow to Years of Discretion, I am determined to throw into a great Kettle and Boil till they are clean, if I ever find them half as nasty as I have seen some."[129] Thomas Jefferson echoed these sentiments when he instructed his eleven-year-old daughter in 1783 that she should have her clothes cleaned before the dirt became visible, and that "above all things and at all times let your clothes be neat, whole, and properly put on." "Nothing is so disgusting to our sex as a want of cleanliness and delicacy in yours. I hope, therefore, the moment you rise from bed, your first work will be to dress yourself in such a style, as that may be seen by an [sic] gentleman without his being able to discover a pin amiss."[130] The social advantages of cleanliness for women were expressed by one British officer traveling in America who noted that, "Every Girl who has a pretty face and good Clothes, is free to come [to a Ball], and is well received at Publick places there, where there is no sort of distinction in persons."[131] The "cleaner" woman were the more feminine or ladylike they were considered, and presumably more marriageable.[132]

Dirt was connected to, among other things, the socially low, and sexual immorality.[133] The similarities in language and imagery that are used to characterize unsuccessful housewives and "sluts" highlighted the social importance of keeping a clean home and tidy personal appearance for women in the colonial era. The appearance of the homes and bodies of both bad housekeepers and sluts were often characterized as

disheveled and dirty, and these women were criticized for their lack of skill in fundamental homemaking tasks.[134] Settlers aligned housekeeping skills with personal morals for women. Physical and moral disorder was reflected by dirt. Being considered a slut or a whore by other settlers created more than potential social embarrassment, because it had serious social and economic consequences for accused women.[135] If courts did not take action against women accused of shameful behavior, communities punished female transgressions with public humiliations.[136] Social opinion was very important, and both men and women felt pressure to behave in a manner deemed appropriate to society.[137] In her study of American domesticity, Phyllis Palmer found that, historically, "Sex, dirt, housework, and badness in women are linked in Western consciousness."[138]

Witches

Another important risk of failing in their domestic duties for women was that their husbands and children might seek the support and comfort of other women. As early as the fourteenth century at least one author claimed it was not witchcraft or enchantment on the part of a woman to either retain or draw away men, but simply a failing on the part of the woman whose husband left her to live up to her domestic responsibilities that resulted in her family members' departure.[139] The idea that witchcraft could serve as one means by which some women controlled their environment was not unusual.

In English cultures, the figure of the witch was ambiguous. In general, a witch was a woman who behaved in a manner contrary to the accepted societal norms for a wife and mother by using magic and consorting with the devil. The presence and activity of

witches were used to explain misfortune and to reinforce the acceptable roles for women in society; whatever a witch was, a good woman she was not.[140] Any perceived failings on the part of "good" women in their domestic duties could be construed as evidence of their being a witch, or being affected by a witch. For example, one woman in Kecoughtan parish Virginia was accused of witchcraft in 1626. Kathleen Brown reports that, "evidence of her behavior was presented in the form of lost or compromised feminine, and masculine skills among the neighbors."[141] Witches were often characterized as dirty, ragged, and capable of perpetrating all sorts of domestic malice, even "the infestation of clean houses with lice."[142] So, the infestation of a home could be attributed to the failure of the women there, or to the action of a witch. In this context, the risks that poor housekeeping presented, including the presence of pests, were not restricted to damaged food and materials, or compromised social standing. The presence of pests as a result of "failures" on the part of a housewife could contribute to the implication that a woman was a witch, especially if the insects or other vermin could be construed as "familiars," or attendant spirits in animal form, of the witch in the household.[143]

In her study of witches, Sylvia Bovenschen found that it had been widely believed that women had an intimate and authoritative relationship to nature. However, by the time settlers had moved to the Chesapeake the view of women had shifted, and they were increasingly viewed as objects of a male-dominated and controlled nature rather than controllers of it themselves.[144] In this context, the seeming control over nature demonstrated by a skilled woman's use of "mysterious" plants medicinally, and to make poisons and repellents for regulating pests was not normative and led to suspicions. This

chemical competence left women vulnerable to accusations of witchcraft for using these materials to do harm, or of behaving as a witch just by having these ingredients. This created a dangerous irony for women, if they "failed" in their normative roles of housewifery and allowed pests to invade their domain they could be considered witches because they certainly were not good wives. However, if they tried to prevent, repel or destroy pests with herbal or chemical receipts, the knowledge, possession and use of these concoctions also put them at risk of being considered witches. The very nature of their duties as "good" housewives continued to require women to work with all sorts of plants, chemicals and medicines in their cooking cleaning, pest control, and health care. The use of these materials in a malevolent manner revealed witches, but the possession of them created a risk for women of being accused of witchcraft, especially if any aspect of their personal behavior or appearance was abnormal.

Women, including prostitutes or assertive women, who acted outside the sphere of the home could often be considered witches. Mary, the mother of Jesus, became secularized into the housewife and mother. This emphasis on Mary as the model housewife and mother varied over time and place, but in some societies the imperative for Christian women to emulate that model increased, while the risks for those who did not also increased.[145] Although there were not very many witch trials in Virginia during the colonial period, the witch was a powerful cultural symbol and she always seemed perched on the edge of manifesting herself. The cultural and social fear among seventeenth-century women of falling into this category of witches was very real. Even in communities that did not have great numbers of witch trials, people were familiar with the behavior and

circumstances that qualified as unacceptable for women, and even without having read formal texts on the subject, they knew what to expect in terms of social responses to this behavior.[146] While the fear of witchcraft had subsided by the late eighteenth century, it was still a powerful cultural metaphor used to reinforce views about women and their behavior. A 1772 poem published in the Virginia Gazette demonstrated the hostility felt towards witches. In the poem, "The Witch, " the author expressed his or her desire to retaliate in kind when he or she felt the effects of a witch's behavior, "The tell, ye Gods, how much I itch/ To Fire at once the potent Witch:/ From Scheme to Scheme I restless turn,/ To make the dread Enchantress burn."[147]

Resources for Women

It is clear that women's role in connection to pest control came, in part, from their familiarity with the plants, herbs, medicines, and toxicology that their responsibility for cooking, cleaning, medicine, mortuary practices and other aspects of domestic economy required. Sources with information about chemical knowledge and pest control strategies included: prescriptive literature (vermin-killing manuals, domestic economy manuals, cookery books, etiquette manuals, and even magic books), personal papers (letters, diaries, and other writings), court records (personal property tax accounts that include listings for pest damaged and related items), newspapers reporting infestations and advertising for related products, and letters to the editor with recommended remedies; encyclopedias describing the pest animals and insects and even including repellent or extermination schemes, and almanacs. Perhaps the most important resource for women

and the least evident in the historical record was the oral tradition of women's work.[148]

Literate women often had personal papers, including copied recipes, medical remedies, and domestic economy advice, which were passed down and supplemented over the generations. This information had the advantage of the implicit endorsement of the generations that preceded, and often the explicit endorsement of the woman who provided a given receipt, or a person for whom the given receipt worked especially well.[149] Printed and published prescriptive literature in cooking, cleaning, and deportment was also popular and valuable to many people.[150]

Many cookery and "physic" manuals found their way into colonial American homes. In the seventeenth century, settlers relied on imported texts.[151] Mrs. Glasse's The Art of Cookery Made Plain and Easy appeared more frequently than any other cookbook in Virginia inventories and was advertised the most often in the Virginia Gazette in the 1760s and 1770s. It was sold from the Virginia Gazette office.[152] Some imported texts were solely cookbooks,[153] but many more were a combination of cookery and "physic" or medical books.[154] Cookery books frequently included medical remedies and other household responsibilities for women.[155] The regular inclusion of pest control remedies in seventeenth- and eighteenth-century cookbooks suggests that vermin were a particular problem in the kitchen.[156] Many of these cookbooks retained some of the qualities and information of early herbals.[157] The first "cookery" book printed in America was a 1742 reprint of an English title, E. Smith's The Compleate Housewife or Accomplish'd Gentlewoman's Companion, although the Williamsburg, Virginia publisher adapted it to what he perceived to be the needs of his American clientele.[158] Cookery books printed in

America before 1800 were largely reprinted English texts, but the discoveries and tastes in America led to the incorporation of American ingredients in otherwise English authored and published texts.[159] The few exceptions were published in New England and New York.[160] No known examples of cookery or domestic economy books were authored and printed in the South in the Colonial period.[161] The English imports and reprints in America rarely completely addressed the needs of American colonial housewives who turned to native materials to supplement their housekeeping practices, including pest control strategies.[162]

Although these manuals included remedies for controlling garden and other pests,[163] in general the cookery and physic manuals focused more on food and medicine. Domestic economy manuals and guides to housewifery typically included more pest control schemes than cookbooks. However, these domestic economy manuals were very often bound with, or included sections on medicine and cookery.[164] Even the early domestic economy manuals made it clear that the range of responsibilities women had in the home extended well beyond the kitchen.[165]

Women could also draw on vermin-killing manuals to regulate pests in their homes. The format of the "vermin-killer" manuals was similar to the cookery and domestic economy texts. In fact, these books very often included guidelines for a range of domestic economy tasks as well as schemes to eliminate pests.[166] These texts reveal that regulating pests was largely motivated by the degree of disturbance they caused.[167]

Almanacs provided information, instruction and entertainment for many people in eighteenth century Virginia.[168] From the early eighteenth century through the mid

nineteenth century, almanacs increasingly included some domestic economy information and advertisements for household management books.[169] Eighteenth-century almanac entries seasonally addressed strategies for eliminating agricultural and garden pests more regularly then schemes to control household and body pests.[170] The frequency with which pest control remedies for the farmer and gardeners appeared in almanacs increased significantly towards the end of the eighteenth century and in the nineteenth century.[171] Pests did appear in instructional and entertaining literature included in the almanacs, but generally only as metaphors for some human behavior or as a curiosity.[172] In the late eighteenth century a couple of items specifically relating to household and body pests appeared in Virginia almanacs.[173]

Encyclopedias were another source from which information about pests and pest control could be derived. In the late eighteenth century, information about animals and insects was included in these volumes. Generally the descriptions focused on the animals' origin, physiology, behavior, diet, and range. In general, the authors described animals in fairly neutral language in these sources. However, entries about vermin or pest animals contained negative and subjective language, as well as remedies to eliminate them.[174] These texts are useful for clarifying what an author meant by the use of pest related terms in a given era.[175]

Herbals were another important source for information about pest control. Herbals were texts that included the names and descriptions of a variety of plants and herbs along with their virtues and properties.[176] Prior to the eighteenth century, women worked with plants in an herbal tradition based at home and used for tasks in medicine, burial, cooking,

and cleaning. By the mid-eighteenth century this tradition was joined by a polite culture of botanical art and fashion.[177] "Simpling,"or the knowledge and collection of herbs was among the responsibilities of women from all ranks of society. "Wisewomen" of the villages perhaps relied more heavily on oral traditions and local knowledge while women of the landholding class often had access to recipe and medical books.[178]

One important text in this field was Elizabeth Blackwell's A Curious Herbal. It appeared originally as a weekly serial from 1737-1739 and the author drew on traditional female knowledge of herbs and the preexisting tradition of male authored herbals, while it also contributed to the growing trend in female botanical illustration. This and other herbals of the mid-eighteenth century signaled a shift from one set of valued and valuable skills among women (especially upper class women), to another set. In the decades after 1760, upper class women's "success" in connection to a knowledge of plants and herbs was no longer demonstrated by their applied knowledge of plants and their properties in a wide range of medicinal, culinary, mortuary, and other "housekeeping" tasks.[179] Rather, it was demonstrated by their ability to identify, and accurately and artistically render samples in botanical illustrations. Drawing flowers became a new category of female accomplishment defined in part by a knowledge of art, botany, connoisseurship, and social conventions.[180] This was accompanied by a decline in the use of chemical pest control strategies and an increasing reliance on mechanical schemes.

The English in Virginia learned about some herbs and medicines from the Native Americans. They noted and observed native practices and recorded the appearance and properties of plants and roots.[181] Among the families who could afford servants and slaves,

white women supervised tasks, while many slaves or free black women had the knowledge of simpling and its application in many fields. There was a risk inherent in requiring slaves to implement pest control strategies because it allowed them access to chemicals that had potential as poisons.[182]

Women had a range of resources and influences on which they could draw for information about pest control in the colonial Chesapeake. The risks for women of failing in their roles as domestic vermin-killers included damaged food stores and material goods, compromised physical and social appearances, eroded social status and breached boundaries. Although there were hazards connected to this role, women were the culturally designated guardians of the physical, economic and social boundaries of their families and homes.

Regardless of the specific role women assumed in the domestic economy, or the social perception of women's role in domestic economy, or the importance of their tasks, including pest control, it is important to recognize that pest control affected both production and reproduction and it crossed gender boundaries.[183] In that regard it very definitely contributed to the support and economy of the household. While the work and responsibilities remained the same, by the end of the colonial period public recognition of women's work as valuable labor was waning. In the early nineteenth century housewifery was by in large no longer considered a part of the economy.[184]

Virginia was claimed by the English at a moment in history in which there was an increased commitment to the ideal of patriarchal households and female domesticity as the defining characteristics of "Englishness."[185] The success of this model, and of maintaining

a home in the proper order and free from predations reinforced a sense of accomplishment among the English.[186] The obligations to establish and maintain physical, environmental, and cultural boundaries in the New World required a heightened sense of responsibility and scale than what settlers had known in Europe. This was due, in large part to the fact that the risk of having boundaries violated when pest control or any other boundary maintenance strategies failed had important implications for the success of the colony, families, and individual people. An emergent planter class in the early eighteenth century with bigger and brick houses had become entrenched by about 1730-1760. The landscaping and architecture of their plantations expressed continuing desire for control over nature and society.[187] Domestic pest control functioned as one of the means by which the English in the New World, within their established model of male agrarianism and female domesticity, tried to, first, control nature and their environment, second, establish physical and cultural thresholds, and third, negotiate human interaction with social boundary maintenance strategies.

Despite the links between pest control and the implications for women in the areas of economy, cleanliness, morality, social status, witchcraft, and other elements of social boundary maintenance, historians of domestic economy, women's history, and technology have not considered the importance of pest control.[188] Although many historians of domestic life mention activities like food preservation, cleaning, whitewashing, and laundry that had important implications for pest control, pest control itself and pest control practices themselves were almost never raised.[189] This is unexpected because many of the period sources these authors rely on, particularly domestic economy manuals, did

mention pest control, and did realize that cleanliness was often closely connected to pest control.[190]

In arguing for the importance of studying the domestic economy, Caroline Davidson, has noted the sheer number of people involved in the labor of housework, the immediate impact of such labor, and the insight it can offer into a culture's values, economy and industry.[191] Several other studies have helped to highlight the roles of women in the household and the importance of these roles to the larger social and economic history of the United States. Yet, despite the economic and other impacts of pests, historians have not addressed the topic.[192] The same level of attention brought to bear on housekeeping and the subsequent realization of its importance in American history should be extended to pest control, especially the way that pest control is aligned with "housekeeping," in the fullest sense of the term.

This analysis of pests, pest control strategies, and women's responsibility for social boundary maintenance strategies linked to pest control draws attention to the ways in which the natural environment affected settlers' material culture environment, which they manipulated to demarcate their social environment. One eighteenth-century ideal of a woman represents her as a mother, a Christian, and a housekeeper whose world was bounded by insects. [Figure 31] The bugs may be decorative, or represent bees, a symbol of industry. Nonetheless, the image evokes the reality of women's responsibilities related to pest control and to protecting the boundaries of their homes. Colonial-era settlers of the Chesapeake defined a pest as something that was injurious or annoying to humans when it crossed over literal and cultural thresholds. This understanding of pests meant that

settlers' responses to these transgressors were rooted in ideas about protecting threatened zones. These responses, based on conceptions of exclusion and inclusion, were readily adapted by settlers to reinforce and articulate social boundaries. This realization of the roles that pests and pest control played in Chesapeake culture challenges historians to expand the range of factors that can affect the development of a society, and the range of functions that elements of the material culture world can have.


Figure 1. *The Fly Catching Macaroni.* Print. By Whipcord, del. 1772
Courtesy Colonial Williamsburg Foundation

Figure 2. Squirrel Plate. Ceramic. London. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

Figure 3. Bed with Green Mosquito Netting. Governor's Palace, Williamsburg, Virginia. Courtesy Colonial Williamsburg Foundation

Figure 4. *Girl and Cobweb*. Woodcut. From (Jones 1794)
Courtesy American Antiquarian Society


Figure 5. *A Little Lady in Great Fright*. Print. From (Norman 1795)
Courtesy American Antiquarian Society

Figure 6. High Chest of Drawers. Wood with cedar drawers. Eighteenth-century. Courtesy Colonial Williamsburg Foundation

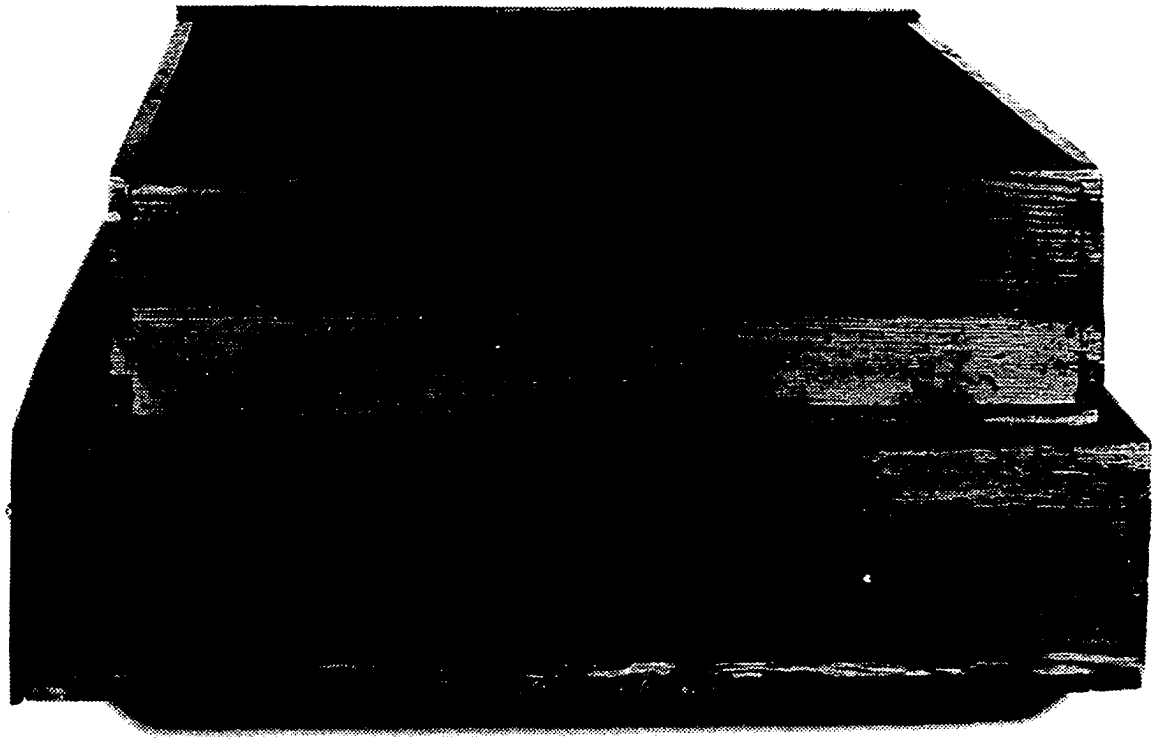

Figure 7. Cedar Lined Drawers. Cedar. Eighteenth-century. From Figure 6
Courtesy Colonial Williamsburg Foundation

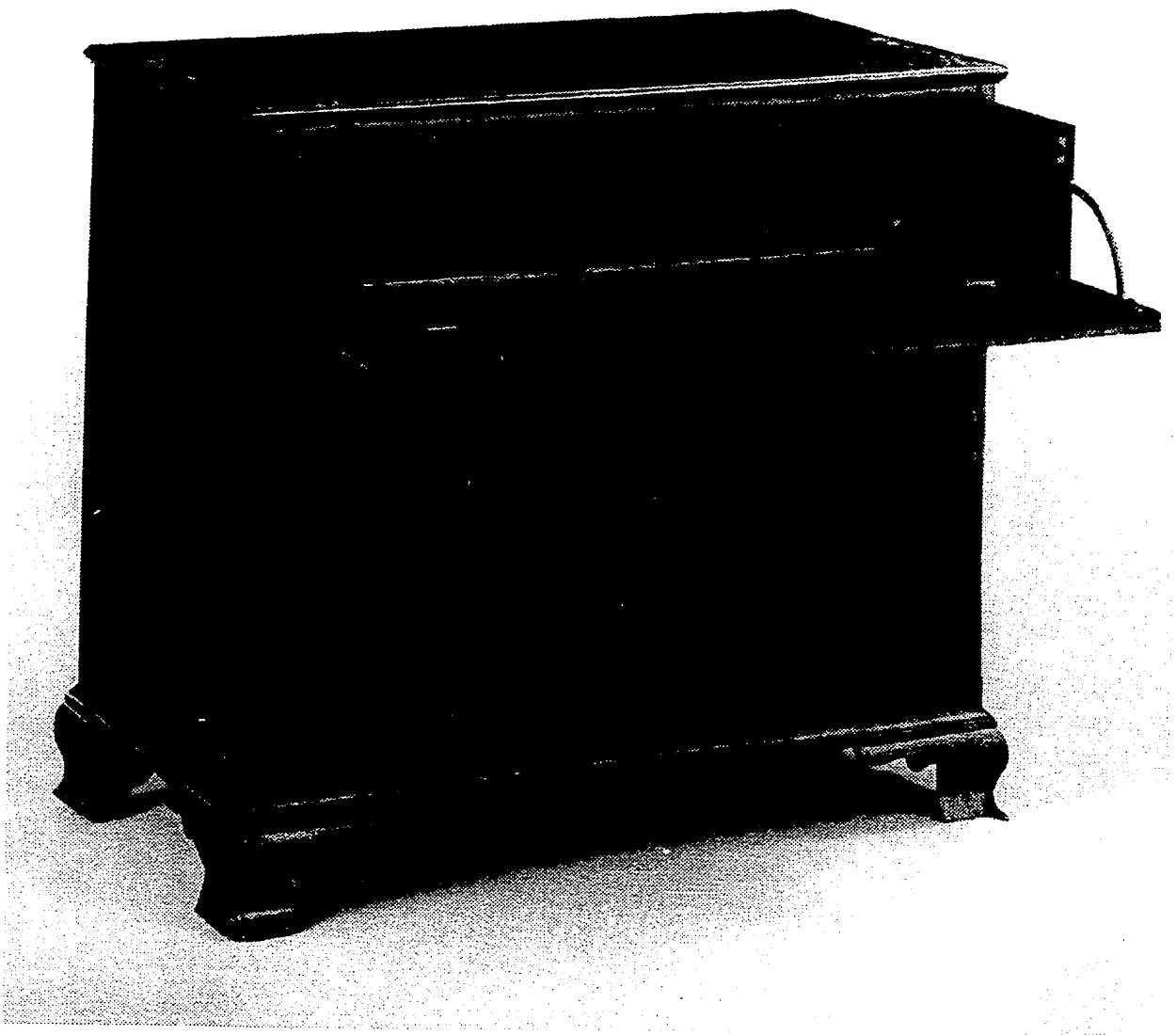

Figure 8. Chest of Drawers. Wood, part cedar. Eighteenth-century, Courtesy Colonial Williamsburg Foundation

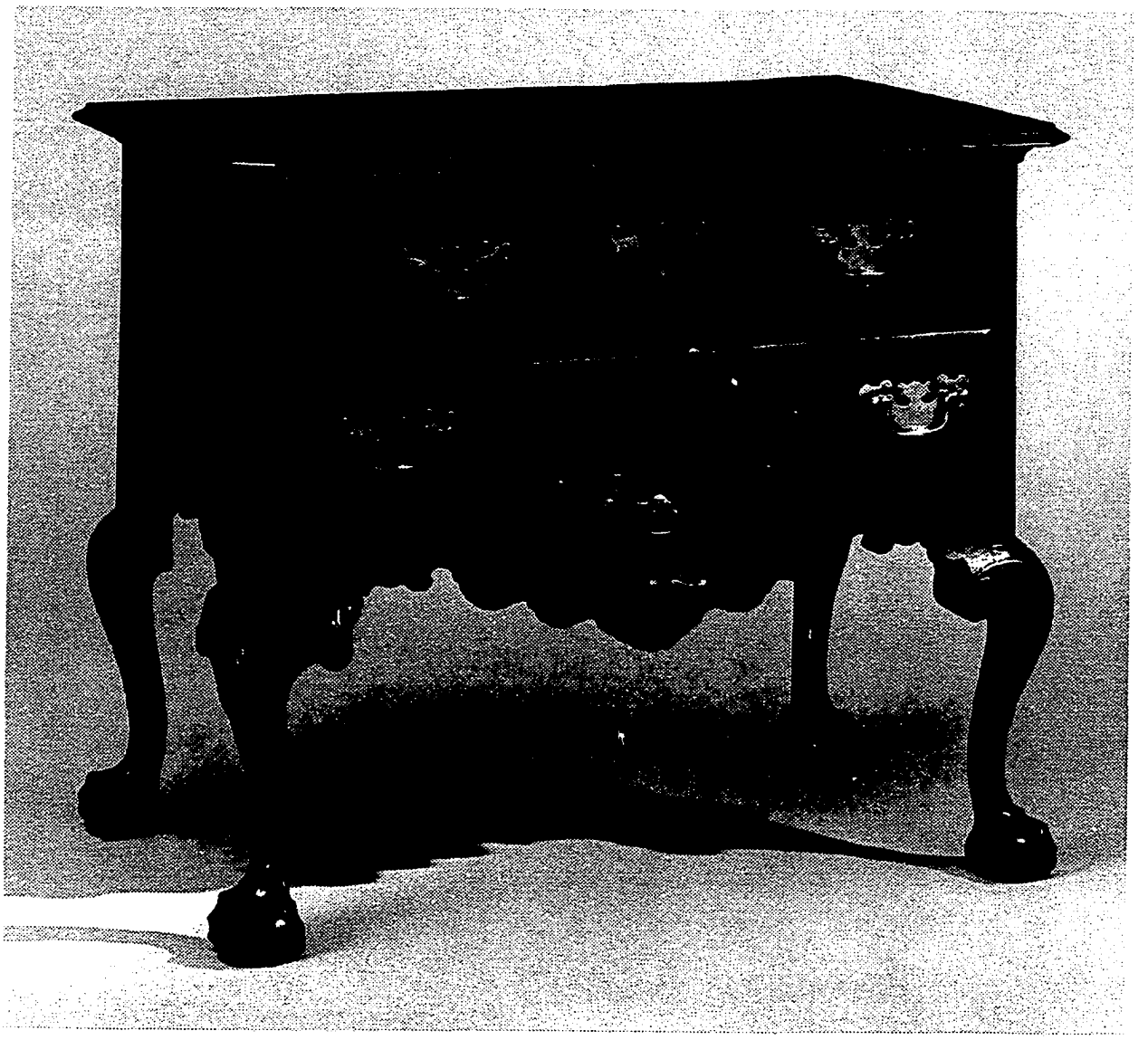

Figure 9. Dressing Table. Wood, part cedar. Eighteenth-century.
Courtesy Colonial Williamsburg Foundation

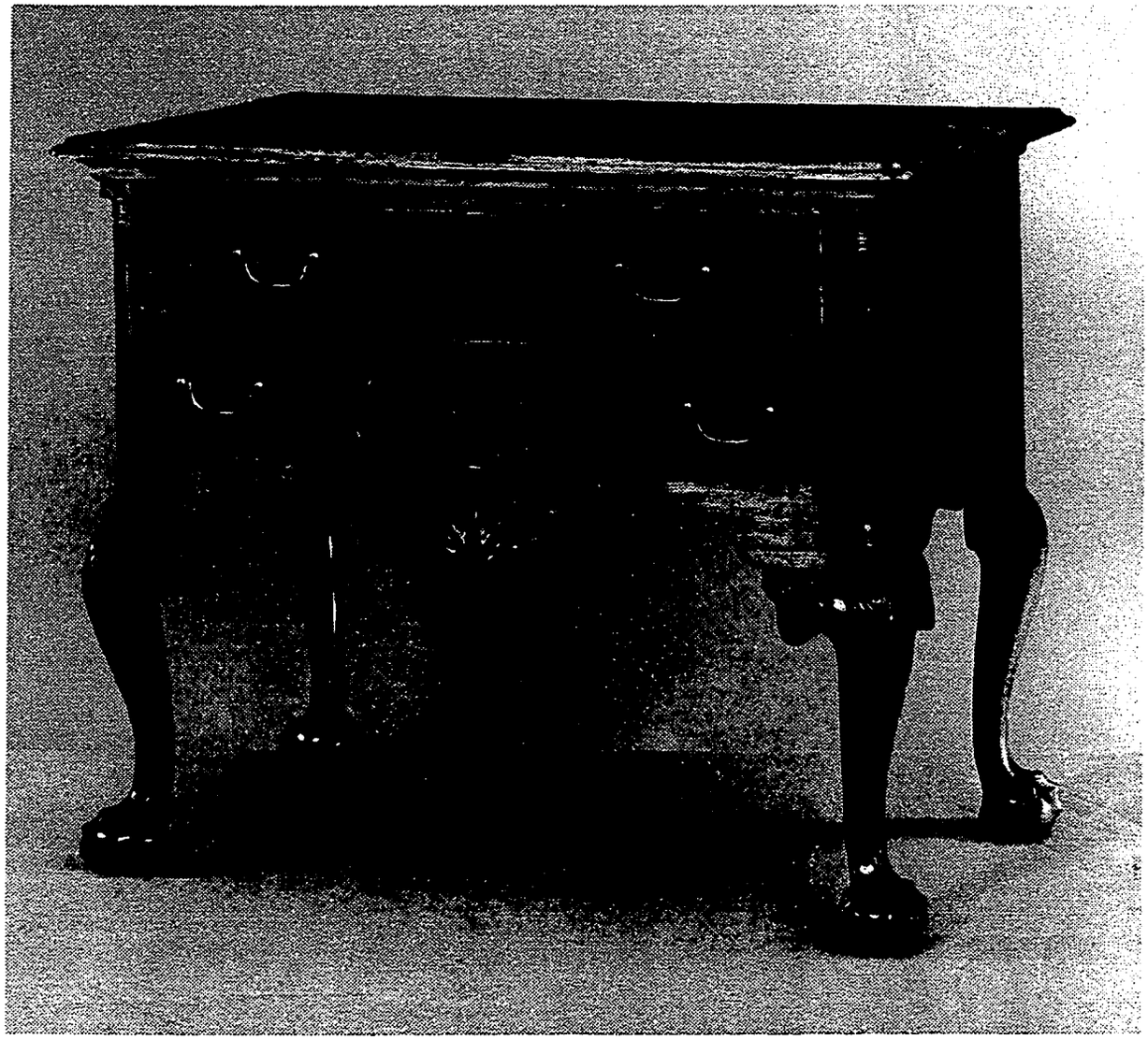

Figure 10. Dressing Table. Wood, part cedar. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

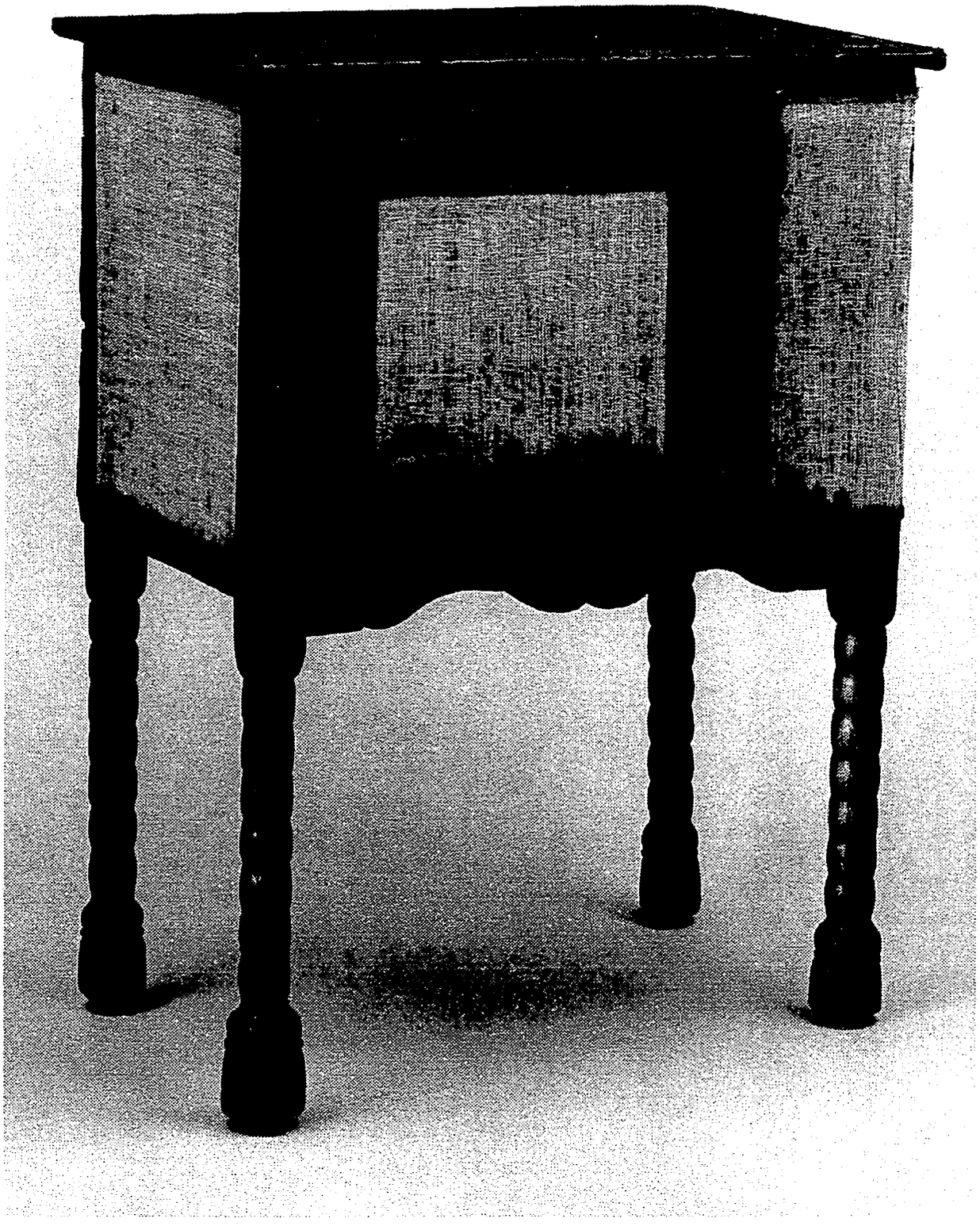

Figure 11. Food Safe. Wood and Gauze. Seventeenth-century
Courtesy Colonial Williamsburg Foundation

Figure 12. Shoo-Fly Chair. Wood and Fabric. Eighteenth-century
Courtesy Colonial Williamsburg Foundation


Figure 13. *Muscipula*. Mezzotint. By E. Savage. 1796
Courtesy Worcester Art Museum, Worcester, Massachusetts

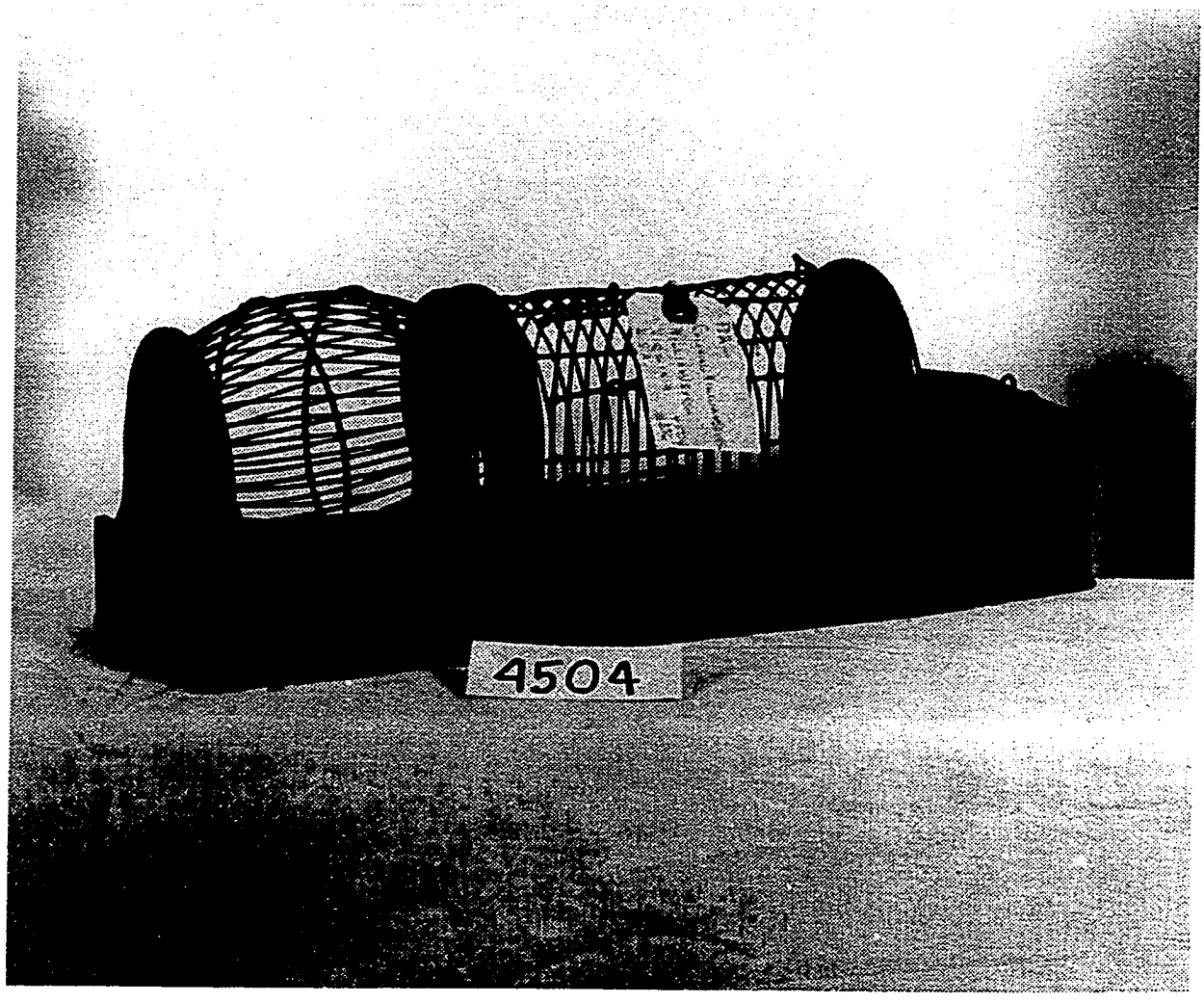


Figure 14. Mousecage. Wood and wire. Circa 1785
Courtesy Colonial Williamsburg Foundation

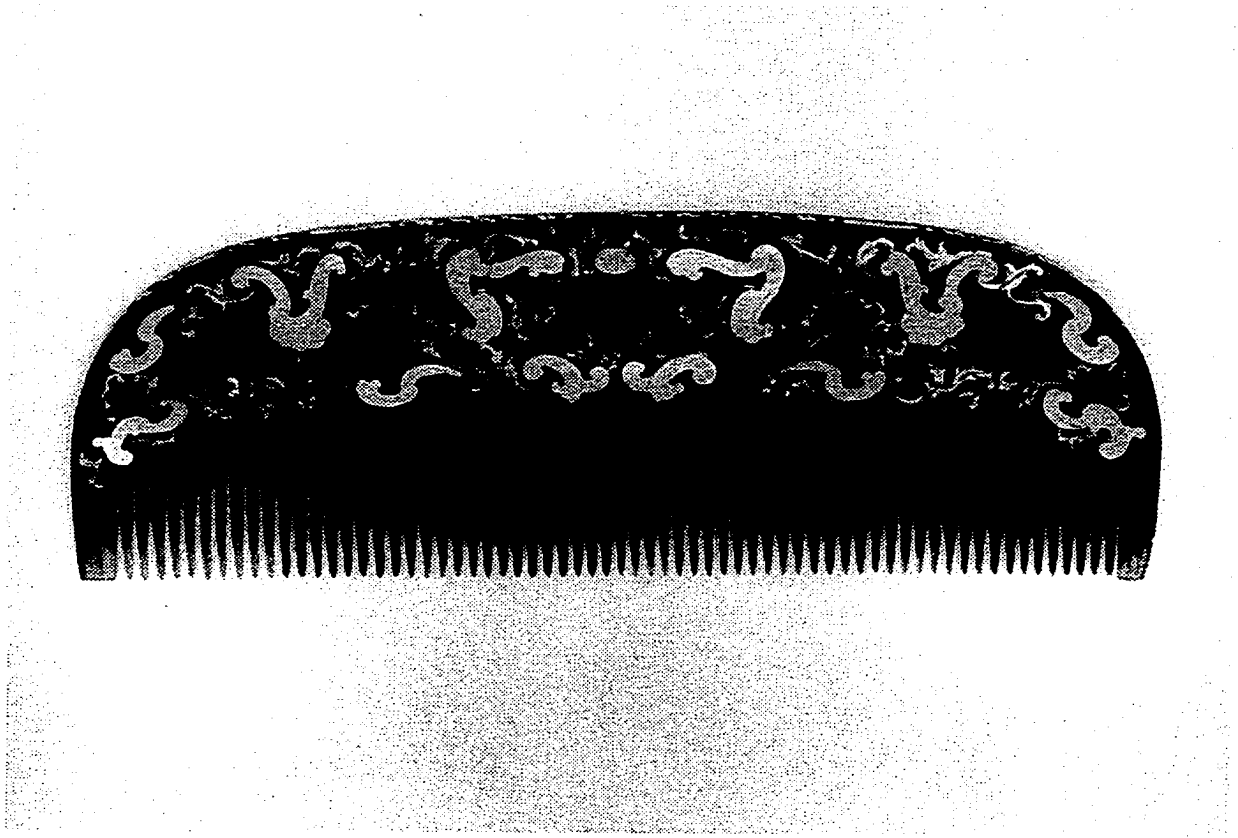

Figure 15. Comb. Tortoise-shell. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

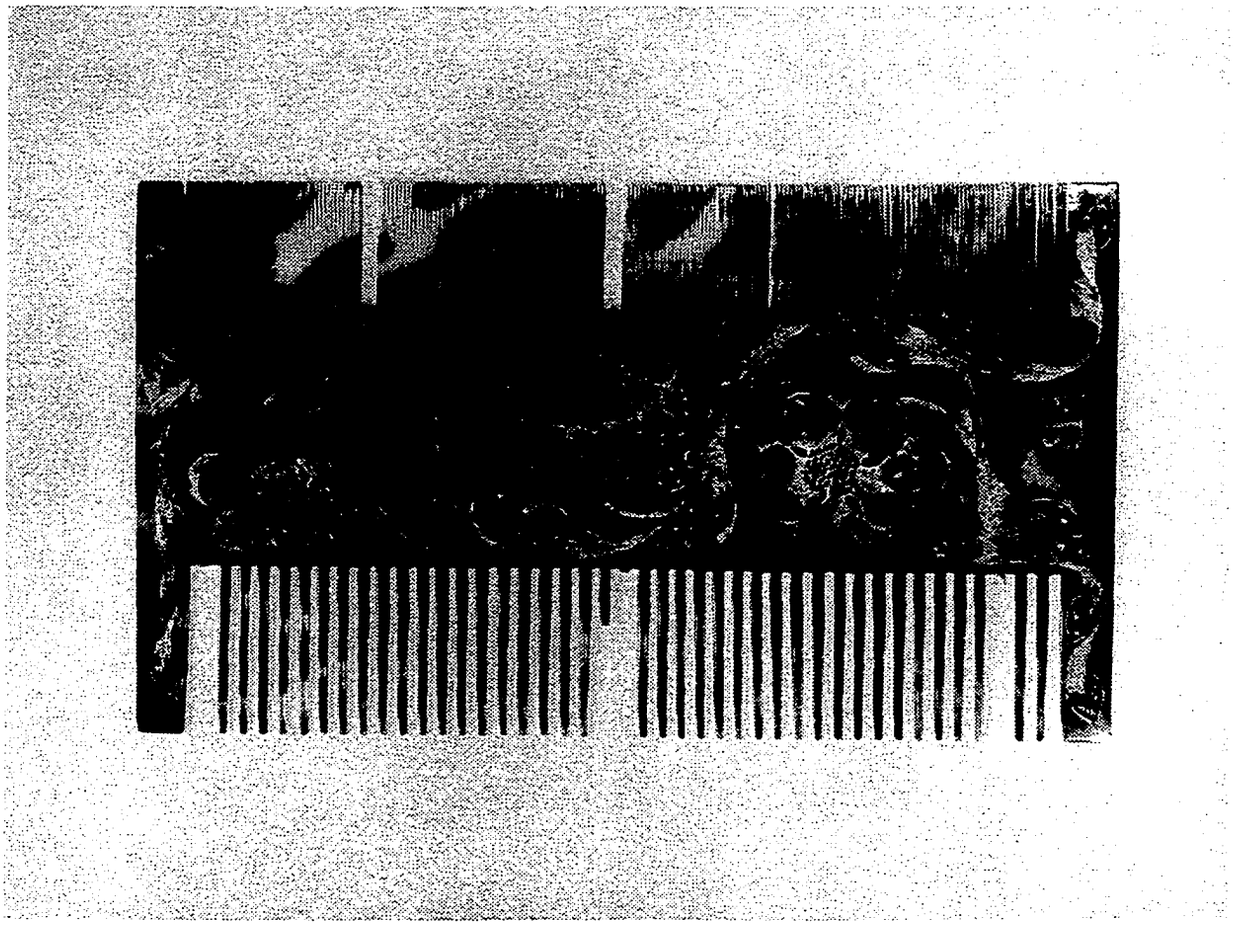

Figure 16. Comb. Tortoise-shell. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

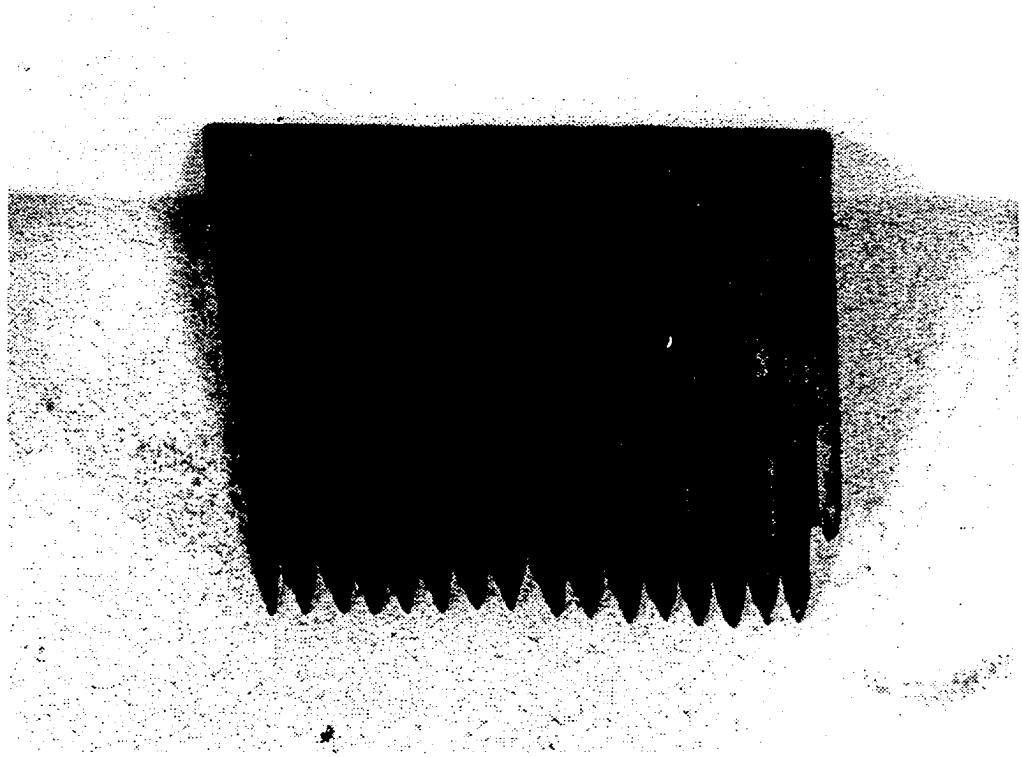

Figure 17. Comb. Maple. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

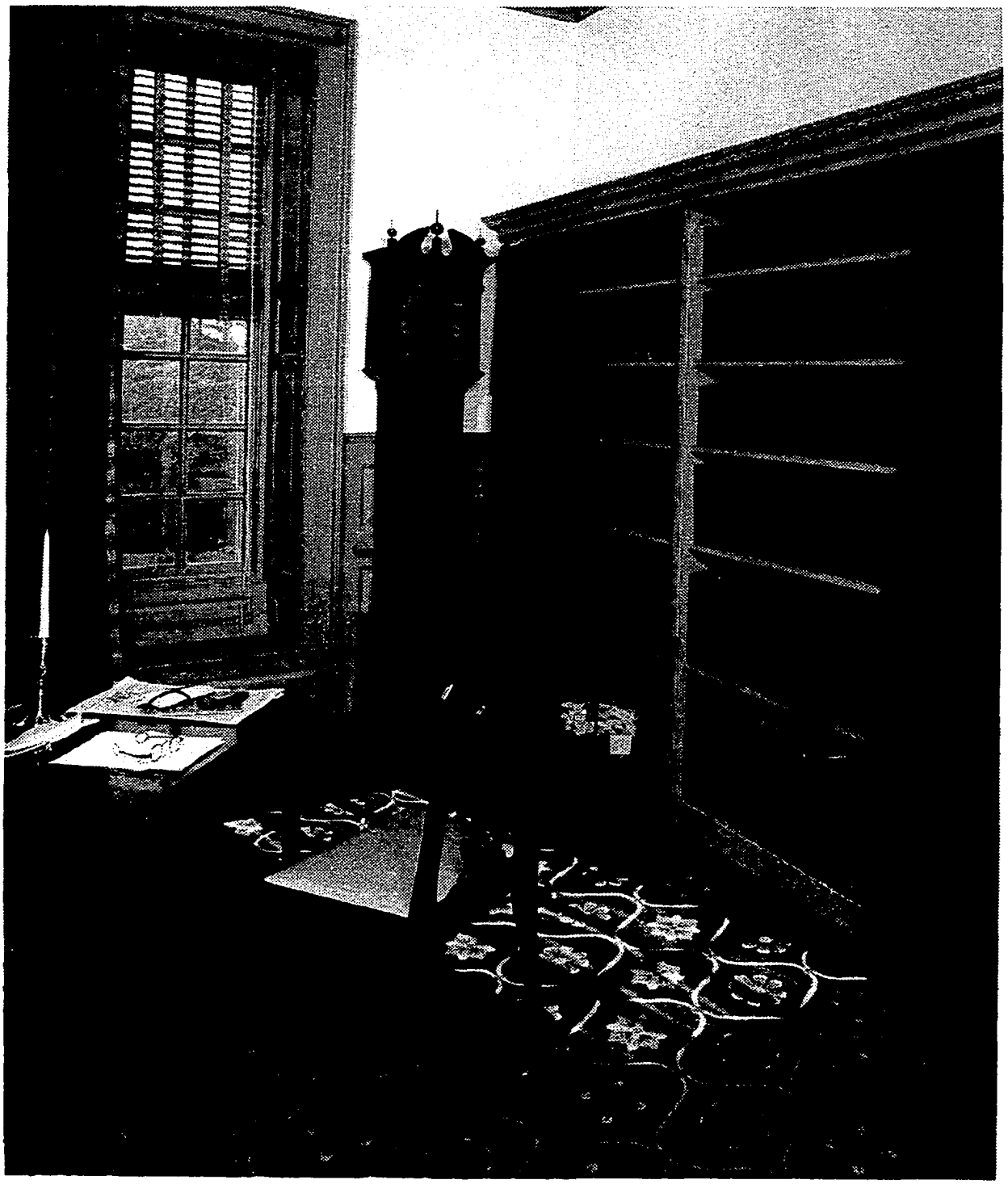

Figure 18. Venetian Blinds. Governor's Palace Study,
Williamsburg, Virginia. Courtesy Colonial Williamsburg Foundation

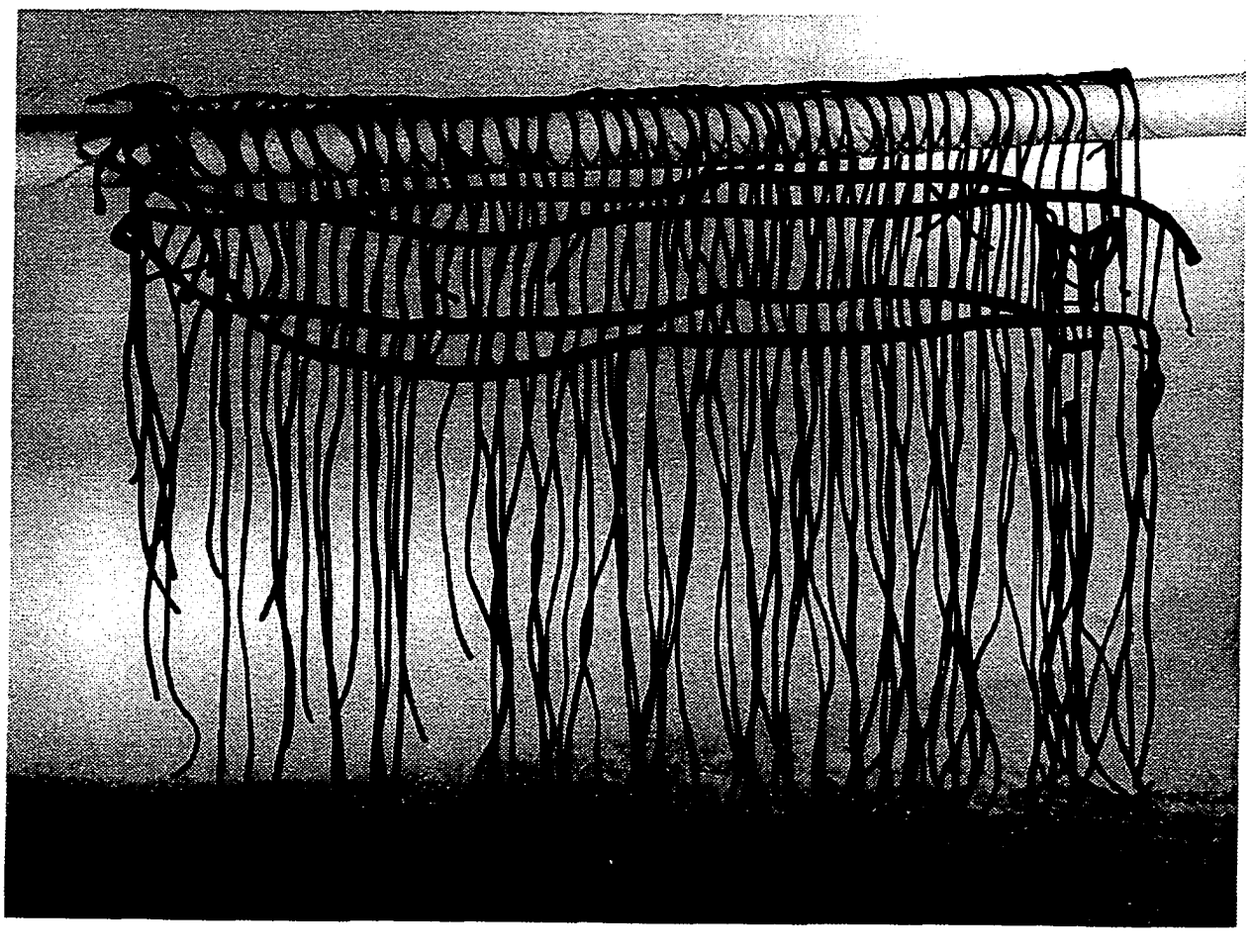

Figure 19. Fly Chaser Set. Leather. Eighteenth-century.
Courtesy Colonial Williamsburg Foundation


Figure 20. *Rat-Catcher*. Print. By Meheux.Eighteenth-century
Courtesy Colonial Williamsburg Foundation

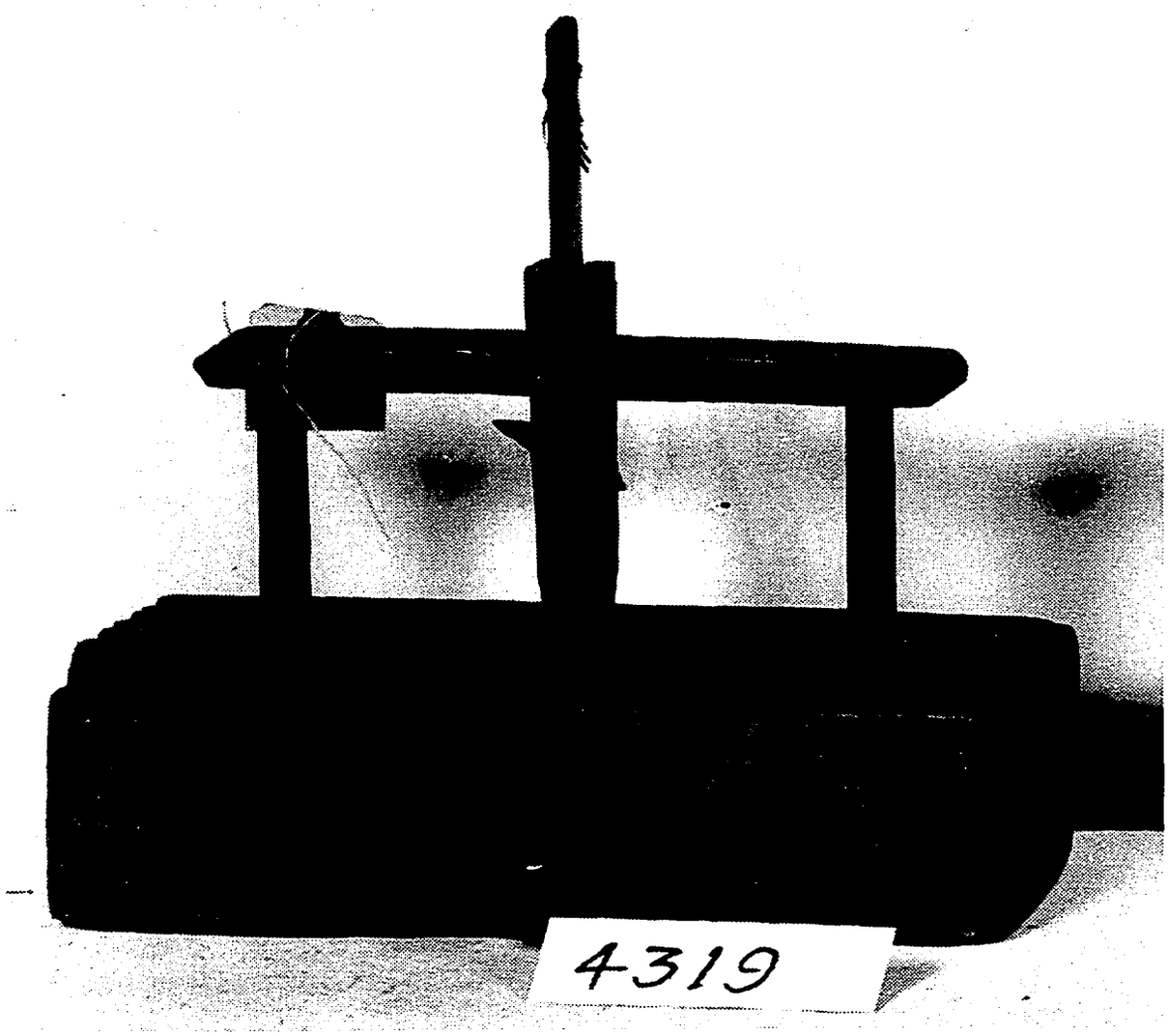


Figure 21. Deadfall Trap. Wood. Circa 1750
Courtesy Colonial Williamsburg Foundation

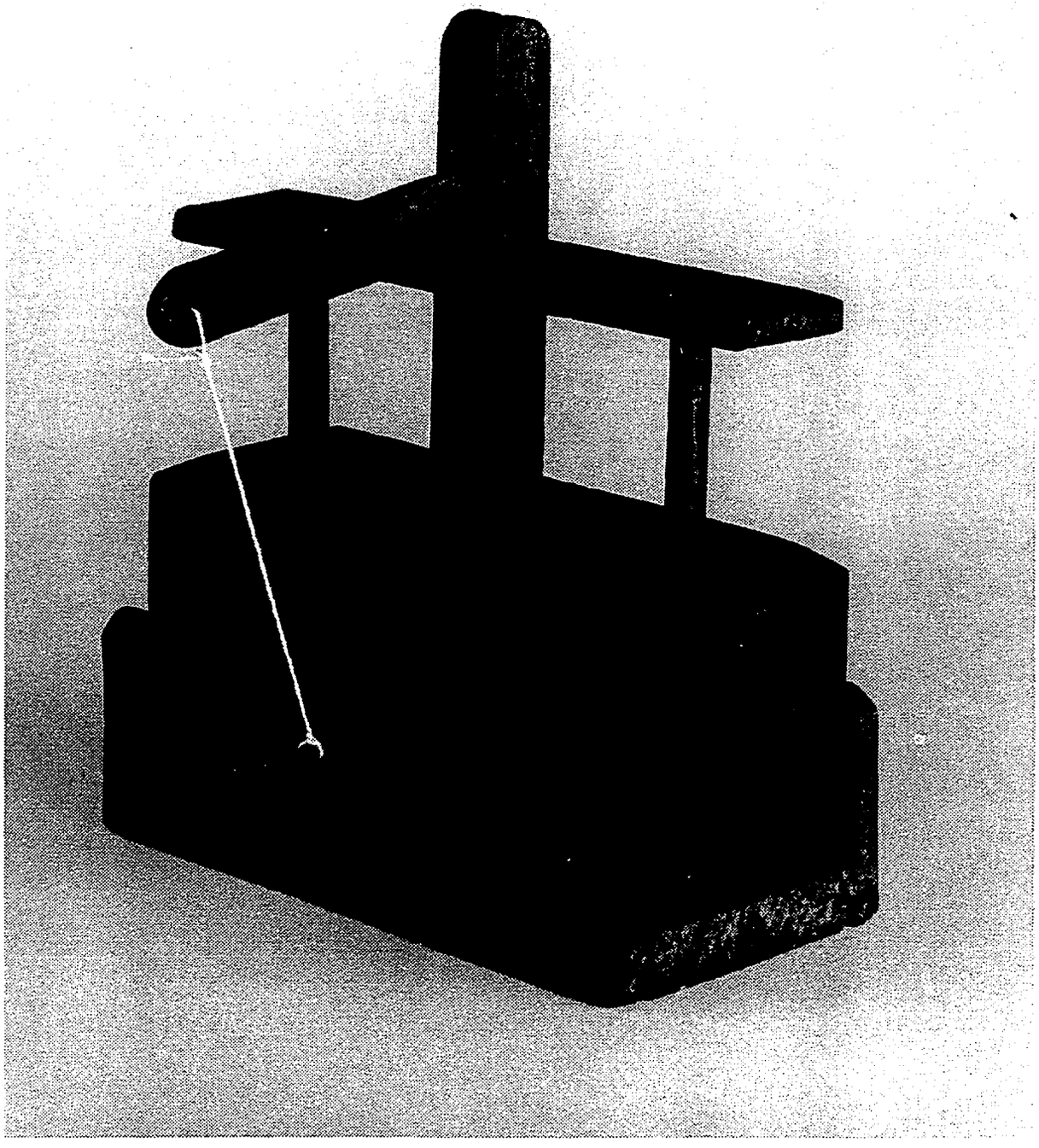

Figure 22. Deadfall Trap. Wood. 1750-1870
Courtesy Colonial Williamsburg Foundation


Figure 23. *The Fumigating Macaroni.* Print. By Marly. 1772
Courtesy Colonial Williamsburg Foundation

Figure 24. Gauze covered portraits and chandelier
Ballroom, Governor's Palace Colonial Williamsburg, Virginia.
Courtesy Colonial Williamsburg Foundation

Figure 25. Bird Bottle. Earthernware. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

Figure 26. Chest of Drawers. Wood, part cedar. Eighteenth-century
Courtesy Colonial Williamsburg Foundation

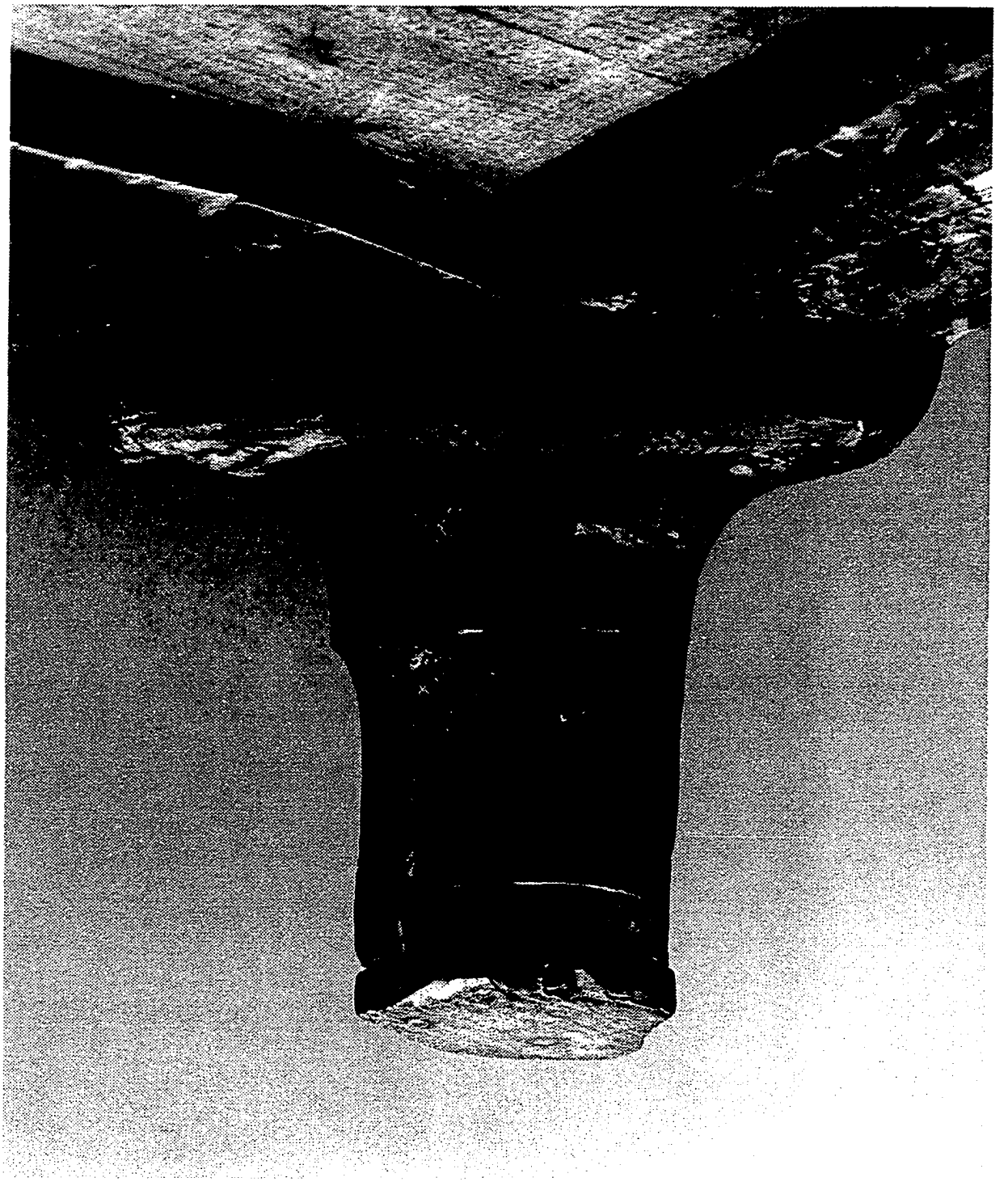

Figure 27. Foot Blocks. Wood. Eighteenth-century.
Detail rear of foot for Figure 26.
Courtesy Colonial Williamsburg Foundation

Figure 28. Outbuildings. Archibald Blair House, Williamsburg, Virginia
Courtesy Colonial Williamsburg Foundation

Figure 29. Outbuildings. Tuckahoe, Virginia
Courtesy Colonial Williamsburg Foundation

Figure 30. Outbuildings, Boxwoods and Garden. Waller House, Williamsburg, Virginia. Courtesy Colonial Williamsburg Foundation

Figure 31. Untitled. Woodcut. View of a woman's world. From (Rowlandson 1771)
Courtesy American Antiquarian Society

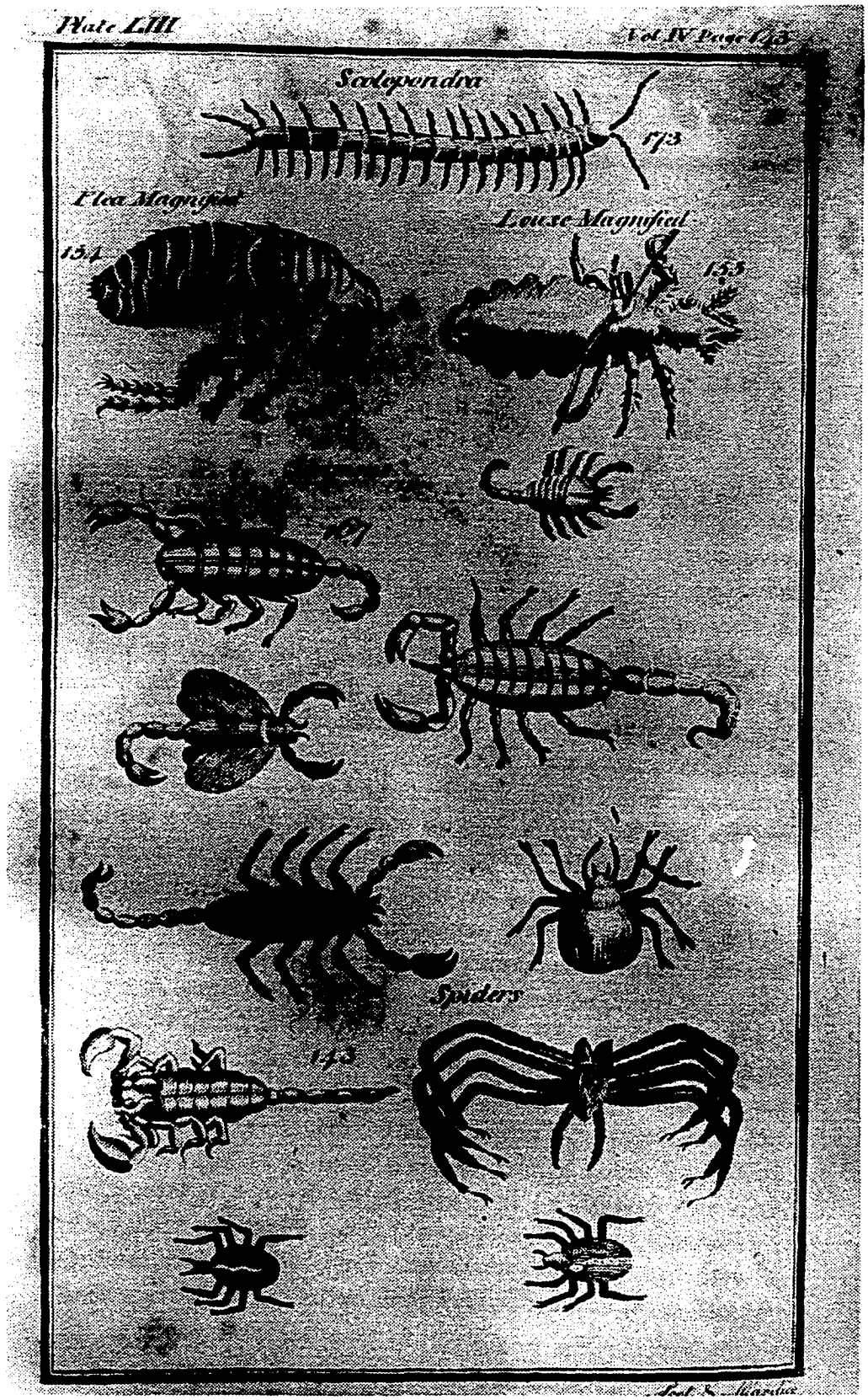


Figure 32. *Plate LIII. Magnified Flea and Louse.* Engraving. From (Dobson 1748) Courtesy American Antiquarian Society

## ENDNOTES FOR INTRODUCTION, PAGES 2-13

1. (Motz and Browne 1988, 1)

2. (Hess 1981, 453-454)

3. (Douglas 1966) (Sollors 1986)

4. In his study of pest control, Harry Rothman characterizes economic entomology as follows: "In examining the dynamics of research and development into pests and their control we are examining also perforce certain dynamics of economic, political and cultural change. The American term for the applied science of insect pest control - 'economic entomology' ingenuously [sic] recognises [sic] this to some extent. Indeed apart from atomic power, probably no other single technology has led to such political furor and bitter recrimination as the debate surrounding the use of certain synthetic organic insecticides. Indeed DDT has become an archetypal symbol of technology 'gone wrong'. Therefore, I believe that an analysis of insect pest control techniques should throw up some valuable insights into the relationship between science, technology and society."(Rothman 1987, 83-84)

5. For example, (Topsel 1658)

6. (Topsel 1658, 3)

7. For example, (Butler 1893)

8. For example, regarding the bed-bug, "This disgusting human parasite, the very discussion of which is tabooed in polite society, is practically limited to houses of the meaner sort, or where the owners are indifferent or careless, or to hostelries not always of the cheaper kind. The careful housekeeper would feel it a signal disgrace to have her chambers invaded by this insect, and, in point of fact, where ordinary care and vigilance are maintained the danger in this direction is very slight." (Howard 1896, 32)

9. (Busvine 1980), (Gordon 1996) The motivation to connect people with the insect world has even expanded to include another context in which many modern Americans have direct contact with insects: automobile windshield splatter. (Hostetler 1996)

10. (Ordish 1960, 21) (Ordish 1981, 33)

11. The use of beeswax on wood floors polished them but also had three effects on wood-borer beetles; "It stopped their absorbing oxygen and discouraged the movement of the grubs to the floor surface; it actually killed some beetles as they attempted to get through the wax layer, but most important of all it made the floors unsuitable for egg-laying." c.1690 (Ordish 1960, 55) Enclosing rafters with a plaster ceiling, and replacing thatch roof with tile also had implications for the pest populations in the house. c.1690 (Ordish 1960,

55). "'I saw signs of mice,' said Mary Barton. 'We must have a cat.'" (Ordish 196,: 65). 1655 brick yard equipped with rat and mouse proof platforms. (Ordish 1960, 80) 1660 Prudence Onway age 14 got a pet bat and trained it to fly around the house eating insects. (Ordish 1960, 92-93) 1856 "Primitive fly-screens installed" (Ordish 1981, 12). Ordish says "The disadvantages of New England as seen by William Wood (1634), were 'rattlesnakes, mosquitoes, gnats, green heads, and lazy men.'" (Ordish 1981, 30)

12. (Ordish 1976)

13. (Ordish 1976, 42)

14. For example, Ordish wrote, "In 1750 the insect established itself in the west-wing quarters for the hired help, where the standards of cleanliness did not obtain as in the main part of the house." He derides some pest control schemes implemented by the hired help. (Ordish 1981, 215-216) He also maintains that body, head and crab lice were introduced to the house by the homeowners' "Indian friends" (Ordish 1981, 231), that bedbugs came into the house by way of old furniture from an old ship that was infested by sailors who carry bedbugs and brought them on board (Ordish 1981, 233), and recounts a 1976 episode of bedbugs believed to have been brought into the house by a french au pair. These pests were really bird mites with no connection to the au pair. (Ordish 1981, 236)

15. (Cloudsley -Thompson 1976, ix)

16. (Hendrickson 1983)

17. (Snetsinger 1983)

18. "The challenge in the age of environmental concern appears not so much one of new pesticides, new technologies or new goals. To be sure there will be new pesticides, new technologies and new problems. The ratcatcher of the sixteenth century reduced the fears of his customers by destroying rats and other vermin, thereby alleviating Medieval fears and protecting family and property. The modern ratcatcher must continue such service, but attempt to more fully understand the fears, concerns and problems of his clients." (Snetsinger 1983, 292)

19. (Linebaugh 1994)

20. (Boydston 1990, xvi-xvii)

21. "Two ingenious mousetraps, as essential part of preservation in most households down the centuries. The one on the left when triggered drops the wooden block on the unfortunate marauder - the one on the right slips a running noose round [sic] the mouse's neck. In some parts of the country, notably in Wales, great wooden cradles were hoisted up to the ceiling on pulleys to keep bread and grain out of reach of mice and rats, Length 8 1/4 inches (left); 6 1/4 inches (right) *Private Collection.* [Photo caption #141] (Feild

1984, 195)

22. (Rothman 1987, 21)

23. (Carson 1962)

24. (Rothman 1987, 18)

25. (Carson 1962)

## NOTES FOR CHAPTER ONE, PAGE 14-40

1. (McKelvey 1975, 13)

2. Some contemporary authors' definitions of pest include the following; "The concept of 'pest' has no objective basis in a strictly scientific sense, it is a social construct based on the perception of the relationship between the species user of the term (humankind) and another species. A wide spectrum of socio-economic and cultural factors may determine whether or not a particular species falls into this category. Often there is no consensus as to whether or not certain species are pests." (Rothman 1987, 82) "Beirne defines pests as '...living organisms that we regard as causing harm to our health or well being...'. However, he notes that it is not usual to include within the ambit of the term those harmful organisms studied by medical, veterinary and marine scientists. The term does not cross certain professional boundaries which reflect social divisions of labour in science and technology. Other conventions which he notes have their roots, perhaps, in the historical evolution of applied biology. Thus nematodes harmful to plants are pests, whereas those which parasitise man and vertebrates are not so described; micro-organisms which cause plant diseases are pests and those which cause human and animal disease, or rot our products, are not. Clearly, there is no logical reason based upon biological science why this should be so. Distinctions such as those adumbrated above result from customs and practices attending those specialist groups which first noted and examined the changing behaviour of the species involved." (Rothman 1987, 82) "This leads to a further observation by Beirne that the use of the term 'pest' reflects particular forms of knowledge and belief as to the nature of the relation between species X and humankind." (Rothman 1987, 82-83) "Clark et al. note that 'Increased injuriousness follows man's need for greater returns or for new resources. New problems arise constantly in this way because higher demands are placed on the quality of natural products, because technical progress creates new possibilities of conflict with previously negligible species, or because changing social and economic outlooks make even relatively harmless insects increasingly objectionable.'" (Rothman 1987, 86-87) "Beirne writes that 'whether or not an organism is regarded as a harmful pest at any place or time depends more on the amount of harm that we tolerate than on the amount that it actually does.'" (Beirne 1964, 14) This tolerance point can be termed the economic threshold. Suffice it to say at this point that the economic threshold's position 'varies widely between victims, places and people' owing to an interaction of technical, economic and psycho-social factors." (Rothman 1987, 87) "Human activity leads to environmental changes which increase or decrease the favourability of the environment for certain species." (Rothman 1987, 87) "Beirne [p.20] goes so far as to state that '...the vast majority of pest problems are caused by man.' Clark et al. argue it is more complex, the result of a network of events; man 'Cannot hope to avoid pest situations...(only) strive to minimise [sic] their repercussions on his economy by manipulating the life systems of the species concerned.' [p.190]." (Rothman 1987, 89) "I have quoted these economic entomologists at length to emphasize [sic] the socio-economic determination and inevitability of pests. It is now necessary to say something about the social and economic perceptions of pests that drive us into a never ending

struggle with them." (Rothman 1987, 89-90)

3. (Russow 1989, 25)

4. (Kellert 1989, 5) In general, researchers have identified ten attitude categories that Americans demonstrate towards animals: 1. Naturalistic - a strong interest in and affection for the outdoors and wildlife. 2. Ecologistic - similar to number 1, but with a focus on wildlife with a higher degree of personal involvement, recreational interest and importance attached to an intellectual understanding of nature, and a systemic understanding of ecosystems. 3. Humanistic - emphasizes feelings of strong affection and attachment to individual animals, typically pets; re: wildlife, typically affectionate for animals phylogenetically close to humans and large and pretty ones. 4. Moralistic - concern for ethically appropriate human treatment of animals and the equality of all animals. 5. Scientistic - biological and physical characteristics, animals as objects of study, wildlife as generators of questions not as pest or recreation. 6. Aesthetic - attractiveness or symbolic significance. 7. Utilitarian - practical and material value of animals. 8. Dominionistic - satisfaction derived from the mastery and control of animals, challenging opponents. 9. Negativistic - active dislike or fear of animals. 10. Neutralistic - passive avoidance of animals by reason of indifference. (Kellert 1989, 6-9)

5. (Peters 1988, 294) (Whayne 1990, 40)

6. (Peters 1988, 294)

7. (Peters 1988, 297-298)

8. (Berenbaum 1995, 144)

9. Theopholis Wreg. described the results of indigo production; "Indico [indigo] has a most intollerable Smell while in steeping and making; and the Fœcs when taken out of the steeper, if not burned in the Ground (for which its good Manure) will breed such prodigious Swarms of Flies as would be thought incredible if related." (Wreg. 1758, 11)

10. Regarding the damage insect pests can cause, Berenbaum reported that, "Paper and glue are susceptible to the predations of silverfish [Lepisma saccharina] roach and others. One of the earliest literary references to the bookworm appears in the Apocrypha of the Old Testament; Moses instructs Joshua to take care of the Torah by anointing it with cedar oil, a highly efficacious insect repellent in its day." (Berenbaum 1995, 145)

11. (Berenbaum 1995, 194)

12. The Biblical plagues included flies, lice, and locusts, as well as murrain or pestilence, boils, and darkness which Berenbaum believes were insect related. (Berenbaum 1995, 194)

13. For example, in one children's text readers learn that honeybees beg for food, and that "her first job is to clean the hive," and that twenty-five species of roach "insist on sharing our homes with us." This language suggests a degree a intention or willful behavior on the part of insects. Such an approach accompanied by seemingly accurate or scientific illustrations helps naturalize or normalize these attitudes as appropriate for insects. (Whayne 1990, 9-10, 37)

14. (Mouffet 1658, 886)

15. De Crèvecouer determined that blackbird depredations preceded from hunger not from any premeditated malice. (De Crèvecouer 1986, 294)

16. De Crèvecouer felt that, "If bountiful Nature is kind to us on the one hand, on the other she wills that we shall purchase her kindness not only with sweats and labour but with vigilance and care. These calamities remind us of our precarious situation. The field and meadow mice come in also for their share, and sometimes take more from Man than he can well spare." (De Crèvecouer 1986, 297)

17. Colonel Landon Carter was alarmed about his bees swarming and theorized that the problem was created by "attempting to civilize things too wild by nature to go in any other manner than as instinct directs." circa 1770 (Greene 1965, 696)

18. (Wright 1966, 293)

19. (Mouffet 1658, 889)

20. (Mouffet 1658, 1027)

21. (Russow 1989, 27)

22. Regarding culture groups that consume animals considered pests by other groups, "The ceremonial foods today [for animal purification chants among the U'wa or Tunebo of the eastern Andean cordllera of Venezuela and Columbia] are mice and frogs, two types of small fish, ginger and a type of pepper. They are used in many purification ceremonies and jointly called e'na ruwa (embryonic meat) and kanoba, and are said to extract 'harm'." (Osborn 1990, 155)

23. (Peters 1988, 303)

24. Hawke reported that in both the colonial north and south women were prosecuted in slander cases against other women they had called a "lousy slut." (Hawke 1988, 107)

25. (Berenbaum 1995, 302) (Gordon 1996, 55)

26. (Berenbaum 1995, 301) (Gordon 1996, 55-56)

27. In reference to a louse on a lady's bonnet, Burns remarked, "Ye ugly, creepin, blastit wonner,/ Detested, shunn'd by saunt an' sinner,/ How daur ye set your fit upon her -/ Sae fine a lady?/ Gae somewhere else and seek your dinner/ On some poor body. (Eliot 1984, 190)

28. (Wigglesworth 1976, 25)

29. (Topsel 1658b, 783)

30. (Bonoeil 1622, 59, 29)

31. (Tyler 1946, 51)

32. Jones, Hugh. 1724. The Present State of Virginia from whence is Inferred a Short View of Maryland and North Carolina. London, edited with an introduction by Richard L. Morton, Chapel Hill, University of North Carolina Press, 1956. Cited in (Yentsch 1994, 250)

33. (Simpson and Weiner 1989, Vol. XIX, 547-548)

34. (Tyler 1946, 58)

35. "Virginia Company Discourse of the Old Company, April 1625." Cited in (Kingsbury 1935, Vol. IV, 525)

36. March 31, 1623 letter to John Ferrar from William Capps in Virginia. Cited in (Kingsbury 1935, Vol. IV, 77)

37. A 1675 hurricane in Virginia was referred to as carrying "Pestilential Blasts" unknown in England. (Greene 1992, 19)

38. A circa 1752 witty manuscript, entitled "A Satyr on Tobacco" circulated among the students at Harvard University. The first line read "Tobacco, mortal Pest! Of Weeds the worst." Nathan Fiske Notebook, The American Antiquarian Society, Worcester, Massachusetts. Cited in (Shields 1990, 238). A 1764 poem described a careless and unobservant planter who "reclines/On Luxury's soft lap, the pest of wealth;" (Grainger 1764, Book II, verse 42-43, p.55). In regards to vagrants in Williamsburg, Virginia some felt that, "...vagrant strangers are suffered to fix themselves here [Williamsburg]. Who generally turn out a pest to society, by encouraging our slaves to plunder ns [sic]; and are a nuisance to those among whom they reside, by their bad behaviour." Virginia Gazette A letter from Timothy Telltruth. (Purdie and Dixon July 7, 1768 p.2 col. 3). The "Pests of Society" enumerated in an 1806 periodical article, included false friends, avaricious judges, and an amorous old woman. (- 1806, Re: "Pests of Society). Another "pest" was eulogized in his 1807 mock epitaph printed in a newspaper; "Here low he lies who was a pest on earth, / To virtue, honor, and shame unknown,/ Low cunning triumphed at the

ruffians's/ birth,/ And villany straight mark'd him as her own./ (- 1807: Re: Epitaph, p.272)

39. Regarding the use of the term pest in reference to a person; "In the eighteenth century the wits were busy trying to suppress such quacks as John Hill with his 'Essence of clock, valerian and sage/ At once the disgrace and pest of his age.'" (Blanton 1931, 135)

40. Smallpox outbreaks in the area of Norfolk, Virginia resulted in the establishment of several quarantined "Pest" houses. Virginia Gazette ( Purdie and Dixon Aug. 25, 1768 supplement, p.2 col.1) ( Purdie and Dixon Sept. 1, 1768 p.2 col.2) (R. Sept. 1, 1768 p.2 col. 4) (R. Sept. 8, 1768 p.2 col. 3) (R. Oct. 20, 1768 p. 2 col.1) (R. Nov. 24, 1768 p.3 col. 1)

41. For example, in 1624 Governor Wyatt of Virginia instructed that, "a care must be had that the ships come not over pestered." Brown's The First Republic p.569. Cited in (Blanton 1930, 35-36). Another circa 1623 opinion held that, "The mortality which is imputed to the country alone is chiefly caused by the pestered ships which reach Virginia victualled with musty bread and stinking beer." Calendar British State Papers, v. 1574 - 1660. p.41. Cited in (Blanton 1930, 36). In addition, in 1636 Governor West of Virginia reported to authorities in England that, "I find with all that muche imputation indeservedly lyeth upon the Countrye, by the Merchants crime whoe soe pester their shipps with passengers, that through throng and noysomeness they bring noe lesse than infection among us which is soe easily to be distinguished from any cause in the malignitie of the clymate, that where the most pestered shipps vent their passengers they carry with them almost a general mortallitye." Neill, Virginia Carolorum, p.130. Cited in (Blanton 1930, 35). Also, in 1611 Sir Thomas Dale wrote to the President and Council of the Virginia Company that, "For true it is we being understripped of Tonnage, and pestered by that means, that our goods filled up the Orlage having no room for our men to be accommodated, but crowded together their own aires and the uncleanliness of the ship, dogs, etc., gave some infexion amongst us and was the cause of the loss of well more a dozen men." Neill, Virginia Carolorum p.489. Cited in (Blanton 1930, 35)

42. Benjamin Henry Latrobe reported from Eagle Tavern in Richmond, Virginia on August 10, 1796 that, "Having been pestered by the flies in my apartment on the ground floor, I moved up one pair of stairs." (Carter 1977, 186)

43. In reference to scorpions in Languedoc, France the author reported that, "it is one of the greatest pests that torment mankind:" (Goldsmith 1795, Vol. IV, 168)

44. An eighteenth-century encyclopedia claimed that, "The rat was first introduced to America by the Europeans in 1544, and is now the pest of all that continent." (Dobson 1798, Vol. XII, 455)

45. Latrobe felt that, "But the pest inseparable from the locality of New Orleans which no human effort can extirpate, are the Muskitoes, the *Marangouins*." and that, "The noise and activity of these pestiferous animals lasts about an hour, when it abates and almost ceases." Benjamin Henry Latrobe, 1819. Cited in (Carter 1980, 305, 306)

46. (Pester 1819)

47. (Peters 1988, 1) The anonymous author of the 1699 book Insectotheology, Or A Demonstration of the Being and Perfection of God From A Consideration of the Structure and Economy of Insects, argued that insects exist for the material benefit of humankind, put on earth by God for Man's use. Cited in (Berenbaum 1995,165) Regarding insects Topsel felt that, "...they serve as much to set forth the Wisdome and Power of God as the greatest Creatures he hath made, and are as beneficial to Mankind, not only for dainty Food, but for the many Physical uses that arise from them. John the Baptist fed upon Locusts, and wilde Honey, and we read that our Saviour eat [sic] a piece of Honey comb." (Topsel 1658, 1-2) While Mouffet claimed that, "the greatest God was in the smallest matters, and that there was a spirit in all things, though never so despicable." "And truly, if the fabrick of Insects were worthy of so great and Divine Artificer, how can the contemplation of them be unworthy of the understandings of poor contemptible men?" (Mouffet 1658, 887) Rennie argued that, "An observation of the habits of these little creatures is full of valuable lessons, which the abundance of the examples has no tendency to diminish." (Rennie 1830, 2), and that, "The more such observations are multiplied, the more are we led forward to the freshest and most delightful parts of knowledge; the more do we learn to estimate rightly the extraordinary provisions and most abundant resources of a creative Providence; and the better do we appreciate our own relations with all the infinite varieties of Nature, and our dependence in common with the ephemeron that flutters its little hour in the summer sun, upon that Being in whose scheme of existence the humblest as well as the highest creature has its destined purpose." (Rennie 1830, 3) Naturalists have deemed the study of insects valuable for entertainment, lessons learned, a knowledge gained practically and cosmically, and a sense of God's wonders and balance of nature. (Sorensen 1995, 3)

48. One contemporary entomologist has suggested that, "One reason that insects are the subject of scientific study is that the modifications we make to the environment for our own use frequently increase the problems caused by insects." "In each of the four groups of environmental factors [a place to live, food, other organisms, physical and chemical factors] that influence human population size, insects can be shown to play a role - often one of great significance. Especially important are the influences that insects have as competitors with humans for environmental resources and the role of the insects in human health and well-being." (Peters 1988, 3,5)

49. Mouffet argued, for example, that God did not make insects in vain, nor were insects abject or sordid because, "the divine force and power shew [sic] themselves more effectually in mean things, and they are far more miraculous, than those things the world

with open mouth respects so much and admires." (Mouffet 1658, 885-886)

50. Contemporary entomologist Berenbaum found that, "respectability for the American entomologist has been a difficult goal to attain. There was a time, not so long ago, when the study of insects was regarded at best as a harmless diversion and at worst as an indication of serious mental imbalance." "EVEN after the publication of the decidedly scientific undertakings of Linneaus and other early taxonomists, insect illustrations were benevolently regarded as 'prints that would amuse children and keep them out of mischief' or as challenging models upon which ladies might try out their artistic expertise. Entomology was thought to be the proper pastime for the idle, the effete, or foppish - for those who could find no better way to spend their time." (Berenbaum 1995, 274)

51. (Wigglesworth 1976, 7)

52. (Snetsinger 1983)

53. (Peters 1988, 271)

54. (Topsel 1658, 2)

55. (McNeil 1977, 8)

56. (Peters 1988, 6)

57. (McNeil 1977, 19-63)

58. (McNeill 1977, 1-2) "The lopsided impact of infectious disease upon Amerindian populations therefore offered a key to understanding the ease of the Spanish conquest of America - not only militarily, but culturally as well." (McNeill 1977, 2)

59."A major consequence of the improvement in rural health such as seems to have taken place in England in the century after 1650 was a notable increase in the efficiency of agricultural labor. Healthy people work better..." (McNeill 1977, 220)

60."Diminution of such infections [animal/cattle bearing] and the parallel decay of malaria changed the disease experience of England in far-reaching ways between 1650 and 1750." "In France where enclosure did not occur and the new husbandry hardly got started in the eighteenth century, peasant health remained miserable." (McNeill 1977, 219)

61. (McNeill 1977, 221)

62. (Curtin 1989, 40-41)

63. Patterson, K. David. "Disease Environments of the Antebellum South." Cited in (Numbers and Savitt 1989, 52)

64. (Silver 1990, 12-20)

65. (Peters 1988, 7-8)

66. Patterson, K. David. "Disease Environments of the Antebellum South." Cited in (Numbers and Savitt 1989, 152-155)

67. (Wigglesworth 1976) (Peters 1988) (Weber 1984) (Curtin 1989) (Zinsser 1935)

68. (Curtin 1989, 51)

69. Medical Repository and Review of American Publications on Medicine, Surgery and the Auxiliary Branches of Philosophy Vol. IV p.304-305. Cited in (Weiss 1945, 303)

70. "The summer and autumn of 1800 was very productive of insects in the states of New York, New Jersey, and Pennsylvania and still no considerable degree of sickness occurred, either in city or country. Locusts were so thick in West Jersey and the eastern parts of Pennsylvania - as to keep up a continuous noise! Other cases are cited of numerous forest tree insects but no remarkeble [sic] human illness prevailed. There is therefore no necessary connection between swarms of insects and pestilential seasons. But it is nevertheless true that during some periods of epidemic sickness, there have been great numbers of insects. These however, have been merely accidental [sic] coincidences and by no means indicate a law of nature on the subject. On the contrary - some insects are killed by pestilential air as has been often observed of common house-flies, vast numbers of which died on the approach of the sickness in New York toward the latter part of the summer of 1799. For the future, physicians and others who describe pestilential seasons should be careful not to use the broad and unqualified term 'insect' - but instead particularize the species which is abundant. This is the safest and will mean more to readers." "Insects in Abundance not Necessarily Connected with Sickly Seasons." Medical Repository and Review of American Publications on Medicine, Surgery and the Auxiliary Branches of Philosophy vol. IV p.304-305, 1810. Cited in (Weiss 1945, 302-304)

71. In 1676 Leeuwenhoek reported the existence of bacteria with the aid of his microscopic studies, but it did not occur to him that these "little animals" were connected to disease. (Rosen 1993, 83) There were some early proponents of germ theory in the sixteenth and seventeenth centuries, but no truly acceptable evidence was available to support this view until the 1830s and 1840s when the theory was revived. (Rosen 1993, 85)

72. (Rosen 1993, 81)

73. (Rosen 1993, 85)

74. In 1724 Hugh Jones attributed fever and agues to, among other things, "the Abundance of Damps and Mists from the Water." (Blanton 1931, 66) Pehr Kalm also

noted, "For it has been observed, in this country, that such people as live in the neighborhood of morasses or swamps, or in places where a stagnant, stinking water is to be met with, are commonly infested with the fever and ague every year..." (Kalm 1972, xix)

75. In the late eighteenth century, Elizabeth Sandwith Drinker and her family kept away from Philadelphia in the hot months to avoid the heat, mosquitoes, and illnesses of the city. (Evans 1975, 179-181)

76. (Rosen 1993, 86-97)

77. (Blanton 1930, 4)

78. The Virginia Company advised settlers that, "neither must you plant in a low or moist place because it will prove unhealthful." These directions were ignored when, presumably for defensive purposes, the settlers established their fort on Jamestown Island, an area surrounded by and crossed with swamps, marshes, and a brackish river. (Blanton 1930, 7)

79. (Brown 1898, 131) (Cable 1969, 22) (Blanton 1930, 75-76, 47) Cited from Force: Tracts, V.3, "Lawes, Divine, Moral and Martiall," 1610-1611, 15-16.

80. (Blanton 1930, 75)

81. (Blanton 1930, 74)

82. (Blanton 1931, 93)

83. Personal Communication, William Kelso, Project Director, "Jamestown Rediscovery," July 1995. Regarding ongoing research and archaeological excavation on Jamestown Island.

84. Personal Communication, Marley R. Brown III, Lecturer, History Department, The College of William and Mary and Director, Archaeology Department, The Colonial Williamsburg Foundation, June 2001. Regarding archaeological and documentary evidence of water drainage and control features in Colonial Williamsburg.

85. (Kelso, 1995)

86. (Blanton 1930, 59-72)

87. (Woodfin 1942, 421)

88. (Woodfin 1942, 416-443)

89. Benjamin Waller to the Governor, December, 18, 1791. (Calendar of Virginia State Papers 1881, Vol. II, 666)

90. Chapter XIV, November 6, 1781. (Henings Statutes 1882/1969, 458)

91. (Powell 1949, viii) (Curtin 1989, 65, 68)

92. Although evidence indicates that smaller outbreaks may have occurred in the seventeenth century, the earliest full-blown epidemics of yellow fever in Virginia are believed to have been in 1737 and 1741-42 near the lower Rappahannock River. (Blanton 1931, 54)

93. (Blanton 1930, 72)

94. (Blanton 1931, 52)

95. (Powell 1949, v)

96. (Powell 1949) (Blanton 1931, 54-55)

97. (Powell 1949, viii)

98. People had drawn a connection between swampy areas and ill health for centuries, and one ancient Roman even advanced an early germ theory, "Varro, an ancient Roman, had warned farmers not to build their houses on swampy ground, 'because certain animals, invisible to the eye, breed there, and, borne by the air, reach inside the body by way of the mouth and nose and cause diseases which are difficult to get rid of.' But eighteenth-century scientists had abandoned such notions of tiny monsters in the air, sinister and invisible. Instead, they realized that the air itself was composed of molecular fluids and solids, and somehow, they felt, these became infected." (Powell 1949, viii)

Benjamin Henry Latrobe commented, ironically, on the existence of both mosquitoes and yellow fever in September 1819 in Louisiana, "Its [Louisiana's] capacity to yield or receive by its unparall[el]ed ease of communication with hotter and with colder climates every necessary and every luxury of life that this earth produces might make it one of the most delightful abodes of affluence in the world were it not for the Muskitoes. I say nothing of the Yellow Fever, because I believe that this calamity may be moderated, if not entirely eradicated by a good medicinal police, and under a better understanding of its origins and treatment that now prevails at New Orleans." (Carter 1980, 305) In an 1802 letter from Northampton County on the eastern shore of Virginia Dr. Tankard commented on both the sickly, feverish condition of county residents, then added, "Confound the mosquitoes. I never knew them to trouble anyone upstairs before." (Blanton 1931, 68)

99. (Rutman 1976, 33-39)

100. (McNeill 1977, 247-248)

101. While the Rutmans feel a case can be made for the presence of malaria in seventeenth-century Virginia, Blanton feels that the evidence is unsubstantiated. (Rutman

1976, 33) (Blanton 1930, 51-52) However, Blanton acknowledges that there are abundant references to malaria in Virginia in the eighteenth century. (Blanton 1931, 66)

102. "The disease in its milder form [vivax] it thought to have been general in Europe in the sixteenth and seventeenth centuries." "The more virulent falciparum is thought to have been prevalent in large parts of Africa." (Rutman 1976, 41)

103. (Rutman 1976, 36-41)

104. (Rutman 1976, 50-60)

## NOTES TO CHAPTER TWO, PAGES 41-101

1. c.1776-1783 Poem from Quartermaster Kleinschmidt's journal about Charleston, South Carolina. Kleinschmidt experienced conditions not unlike those encountered in Virginia. (Kipping 1971, 19)

2. (Merrens and Terry 1984, 533-534)

3. (Linebaugh 1994)

4. "Description of Virginia and Proceedings of the Colonie, 1612." Cited in (Tyler 1946, 94)

5. "The Tragical Relation of the Virginia Assembly, 1624." Cited in (Tyler 1946, 422-423)

6. For example, the journal of Jean-François-Louis, Comte de Clemont-Crèvecoeur regarding animals of Virginia does not include any mention of insects or other pests, although he does mention snakes. Nov. 1781 Vol. I. Cited in (Rice and Brown 1972, 67-70)

7. "There was an assay made to make silke, and surely the wormes prospered excellent well, till the master worke man fell sicke: during which time, they were eaten with rats," "Description of Virginia and Proceedings of the Colonie, 1612." Cited in (Tyler 1946, 90) Regarding silk worm houses, "some must watch, that neither Rats, Mice, Birds, nor Poultry come there; for they will eat up the Wormes." (Bonoeil 1622, 6)

8. (Hariot 1588) (G., R. 1609) (Hamor 1615) (Bullock 1649) (Berkeley 1663) (Beverley 1705)

9.(Pownall 1949, 25-29) (Sanson 1959) (Lorant 1946, 21)

10. (Mereness 1916, 394, 397-399)

11. For example, regarding the woods, "..the Woods in this embroidered Garb have in real Nature a Richness of Appearance beyond Conception." (Pownall 1949, 25)

12. Regarding Williams Wood's 1634 New Enlands [sic] Prospect (Franklin 1979, 40-48)

13. (Lorant 1946, 121-124, 125-134, 135-150, 151-154, 155-166)

14. (Kelso 1984, 8)

15. "The Relation of the Lord De-La-Ware, 1611." Cited in (Tyler 1946, 207-208) (Kelso 1984, 8)

16. (Curtin 1989, xiii)

17. (Curtin 1989, 43)

18. "I have reported this journey in some detail so that you may see how much every man, from the greatest to the least among us, wished to discover the mine. For nothing but the discovery of a rich mine or of a passage to the South Sea will make our countrymen settle in Virginia. If either of these could be found, the merits of this country, with its healthy climate and fertile soil will be recognized. And if trade were established, such roots as sassafras and the gums and resins found here would make excellent merchandise to fill out cargoes; otherwise they would not be worth fetching." "Ralph Lane's Report to Sir Walter Raleigh Concerning the English Colony at Roanoke Left by Sir Richard Grencille August 17, 1585-June 18, 1586," p.135-150. Cited in (Lorant 1946, 141)

19. Regarding the heat in Williamsburg, Virginia in June 1782, settlers remarked, "We have had such intolerable heat for the past six weeks that many men have died of sunstroke or have lost their minds." (Kipping 1971, 20) Also, in reference to a 1753 visit to South Carolina by English missionaries, travelers noted that, "..we suffered much from the excessive heat of the weather." (Phillips 1797, 61) Excessive and extreme heat affected soldiers traveling to Virginia, July 6, 1781. (Cromot 1880, 296-297)

20. (His Maiesties Couseil 1620, 1-2)

21. (His Maiesties Couseil 1620, 4)

22. (Bonoeil 1622, vi)

23. (Linebaugh 1994, 1)

24. (Garret 1990, 200)

25. Some of these travel and defensive advantages of the Virginia topography were noted by a soldier during the American Revolutionary War." Ewald Diary." Vol. III p.195. Cited in (Kipping 1971, 18)

26. "Description of Virginia and Proceedings of the Colonie, 1612." Cited in (Tyler 1946, 127)

27. "Description of Virginia and Proceedings of the Colonie, 1612." Cited in (Tyler 1946, 179)

28. "Description of Virginia and Proceedings of the Colonie, 1612." Cited in (Tyler 1946, 136)

29. "Amongst many other weighty Reasons, why Virginia has not all this while made any progression into staple Commodities, this is the chief. That our Governours by reason of the corruption of those times they lived in, laid the Foundation of our wealth and industry on the vices of men; for about the time of our first seating of the Country, did this vicious habit of taking Tobacco possess the English Nation..." "This was the first and fundamental hinderance that made the Planters neglect all other accessions to wealth and happiness, and fix their hopes only on this vicious weed of Tobacco..." (Berkeley 1663, 5-6) Berkeley's description of the beautiful Virginia climate cited in (Berkeley 1663, 2)

30. (Beverley 1705, 2; Book IV, pp. 56, 59-60)

31. Rev. Hugh Jones 1724 The Present State of Virginia. Cited in (Barton 1909, 48)

32. (Kelso 1984, 14)

33. (Beverley 1705, 3) (Jones 1724a, 21)

34. (Hawke 1988, 12)

35. (Silver 1990)

36. (Hamor 1615, 43)

37. (Kalm 1972, xxi)

38. In a chapter called "Of the evills, and such things are hurtfull in the Plantation," Smith remarked in his Generall Historie of Virginia, New England and the Summer Isles on the mosquitoes, flies and "a certaine India Bug, called by the Spaniards a Cacarootch, which creeping into their Chests they eat and defile with their ill-scented dung." (Berenbaum 1995, 275) Berenbaum also mentions pirate John Esquemeling, a "buccaneer and adventurer who boasted of his many bloodthirsty deeds, found to his dismay that in America the flies were bloodthirstier than any pirate could ever hope to be: 'Flies, which excessively torment all human bodies, but more especially such as never before, or but a little while, were acquainted with these countries.'" (Berenbaum 1995, 275)

39.(Mereness 1916, 404)

40. "If the Soil has suffered no great Change, Woods of the same Genus arise; if it hath undergone any Change, either for the better or for the worse, then, as from a Nidus prepared for a new Brood, we see Woods of a different Species, which before appeared rarely, as and Aliens in the place, now form a new power of Vegetation, springing up and possessing the Land as the predominant Wood."c. 1776 source Cited in (Pownall 1949, 24) Kalm noted that Americans abuse their natural environment. (Kalm 1972, xxiv)

41. "The First Settlers of America, for the Sake of the Grass for the Winter Support of their Cattle, fixing their Habitations along these places [salt marshes], being infested with Muskitoes and Intermitting Fevers, gave the Foundation for supposing America unhealthy. The rest of the Chesopeak [sic] Bay, and its Branches, is almost all a clean, gravelly, steep, dry Bank; and were it not for the Scarcity of Fresh Water in some Parts of the Eastern Shore, would be as pleasant a Country as Imagination could well represent." Mr. Lewis Evans' Analysis printed in Philadelphia in 1755. Cited in (Pownall 1949, 128)

42. (Merrens and Terry 1984, 538)

43. (Kelso 1984, 14-15)

44. (Linebaugh 1994, 1) (Garrett 1990, 200)

45. (Anon. 1786) re: Turnip flies (non. 1786) re: Hessian Fly (Berkeley 1663) (Beverley 1705) (Crèvecoeur 1986) (Greene 1965)

46. April 6, 1770 "but a Calf is such a creature that if he does not lie out he will get lousy and if he does he perishes which was an odd dilemma for this bad winter. However, neither my Overseers nor myself thought of lice before they were too far gone. Otherwise by washing with ambur [sic] they are always killed and the Creatures live." (Greene 1965, 383)

47. Carter had a slave make traps to catch mink that destroyed fowl. July 25, 1774. (Greene 1965, 834)

48. "If the powder of a Weasel be given unto a Cock, Chickens, or Pigeons, it is said, they shall never be annoyed by Weasels." "Likewise if the brain of a Weasel be mingled with a rennet in Cheeses, it keepeth them from being touched with mice or corrupted with age." "The flesh of the weasel is not used for Meat, but dried and preserved for medicines." "The powder thereof mixed with water, driveth away Mice, by casting the gall of Stellius in a house where Weasels are gathered together, and then by Oyl of bitter Almonds, or salt Ammoniak they are killed, but if one of their tails be cut off, all the residue do forsake the house." (Topsel 1658, 563)

49. Carter studied the problem of weevils closely and wrote a report on them. He felt that the key was to deprive them of a breeding and hibernating spot in the winter, like the corn house. He planned to keep his corn and wheat storage houses at a very great distance from the fields. Aug. 8, 1771 (Green, 1965, 606) Planters were also advised that one secret to keep weevils out of stored grain was to put a bag of pepper into each heap or cask which will keep them away. "A Progress to the Mines," pp. 339-380. Cited in (Wright 1966, 349)

50. By the end of the eighteenth century many people noted an almost complete disappearance of the rattlesnake from Virginia. Latrobe reported in 1796 from Amelia

County Virginia that some felt one exaltation was that Hogs loved to eat them, and given the prevalence of hogs on farms and free ranging in fields and woods, they had eradicated the rattlesnake population. (Carter 1977, 110)

51. March 17, 1771 Carter's overseer alarmed him with a report of the "chintz bug, which frequently comes among grain sown between corn." Although Carter rejects the idea that they are spontaneously generated and seeks an explanation for their origin... "For I cannot beat the vulgar error that anything can breed a living animal from its particular nature, the thousands of things are to be sure both nidus and pabula for these insects." (Greene 1965, 550) Elsewhere he note the progression of insects from an egg, to a worm, to a fly, and he is aware of their life cycles and seasonality. (Green, 1965)

52. May 15, 1758 Moles dug up all of Colonel Landon Carter's corn, even that planted on the hills which was usually safe from the moles. (Greene 1965, 227)

53.April 27, 1770 "I fear I shall again be as unlucky as I was in the year 1757. A Cold April then brought in such swarms of flies to our plant patches that they eat me up as they did almost everybody else without the least chance of a crop." Carter felt that if the weather would grow warm and moist the flies would leave and he soaked seeds in preparation for another sowing. (Greene 1965, 399) April, 1770 "Flies contrary to observations eat the large plants and let the small ones alone." (Greene 1965, 401) October 20, 1757. An Indigo experiment was damaged by pissants, flies, bugs and worms. (Greene 1965, 181) August 22, 1757 Carter was pleased to see bats in his corn field because they ate destructive flies. He reported a fly remedy suggested by John Tucker of Barbados that involved mixing the roots and branches of sassafras with wheat, but he does not understand how it might work, except perhaps by "affluvium". (Greene 1965, 169) A 1771 letter advocated covering plants with whipping elder branches to prevent or abate an insect infestation. Scots Magazine. Vol. 36, August 1774 p.464. Cited in (Greene 1965, 958)

54. George Washington gave Latrobe a detailed account of the Hessian fly and its movements over dinner on July 19, 1796. They had not yet arrived in Virginia but they were daily dreaded. (Carter 1977, 170)

55.May 3, 1776. Col. Landon Carter was pestered with flies problems and birds that pulled up his corn. He spread brush over fields to discourage flies. (Greene 1965, 295). May 20 1766. "Still replanting corn and shall with difficulty finish this day; so great is the injury that the birds and vermine have done, it seems to be near as much trouble as the first planting." (Greene 1965, 300) April 19, 1770. "The flye eats in my home plant patch but no where else. Somehow they never burn that patch right." [Carter had brush laid over germinating crops that seemed to have had the effect of scorching and drying the area to such a degree that it discouraged flys but not germination.] (Greene 1965, 390) July 10, 1775. Otilans [birds?] broke down barley stalks and ate barley, while blackbirds did the same to oats. (Greene 1965, 920-921) Several species of ants and "little black worms"

infested corn. (de Crevecouer 1986, 291)

56. The use of and variety of chemical pest control strategies practiced into the nineteenth century increased. For example, one 1832 remedy for insects in orchards was to bore holes in trees, and plug them with sulphur which it was felt would be dissolved and carried by the sap throughout the whole tree. (Weiss 1945, 305)

57. Fumigations or sprinkling crops and orchards with dusts or solutions of tobacco, pepper and lime were recommended. (Saunders 1750, 54-56)

58. To protect cabbages, "The misfortune must be prevented at the time of planting. For an acre of ground, take two ounces of *assa foetida*, such as is sold by the apothecary or druggist; put it into a small pot, full of dung juice, and boil it till the whole is dissolved; then empty this decoction into a shallow tub, add a pint or two of dung juice; stir it well with a piece of wood; and carry it to the field for use." Steep plants in this mixture and plant them. The sun and air will purify the plants and the smell will go away. To treat for caterpillars and insects, "Take a pail of dung water, and infuse into it of *assa foetida* 6 dwt. woad 3 dwt. garlick 3 dwt. laurel berries bruised 3 dwt. leaves or tops of alder, one handful, carline, white cameleon, or thistle root, one handful. Let the whole digest for three days and three nights. When you have occasion to use this composition, take a wisp of rye straw, and dipping it in the pail, sprinkle the small plants that are infected by those insects, which will soon perish or forsake the place." "To this remedy we will add another, which is infallible against the caterpillars in cabbage. Sow with hemp all the borders of the ground where you mean to plant your cabbage, and you will see with surprize [sic], that although the neighborhood is infected with caterpillars, the space inclosed by the hemp will be perfectly free; not any of the vermin will approach it." (Waller 1763, Vol. II, No. V May p.232)

59. Carter covered growing plants with oak and other brush and let weeds grow up to protect plants from weather and flies. He found that neighbors who weeded or removed brush earlier had crops decimated. (Greene 1965,721, 806, 824)

60. "These low grounds are exposed, besides [to frost] to the ravages of grasshoppers, an intolerable nuisance. While young and deprived of wings, they may be kept off by means of that admirable contrivance which a Negro found out in south Carolina: a few pots filled with brimstone and tar are kindled at nightfall to the windward of the field; the powerful smell of these two ingredients either kills them or drives them away, But when they have wings, they easily avoid it and transport themselves wherever they please." (De Crèvecoeur 1986, 296)

61.Wrapping the stems of cabbages in hickory bark discouraged black worms. Some found that scarecrows were somewhat effective in driving crows off, as were strings of shingles painted black on one side and white on the other - their motion in the wind frightens birds, shiny pewter plates have a similar effect. Although, hanging dead birds in

"terrorem" to scare live ones away is ineffective. Foxes and birds are repelled by brimstone soaked rags. Insects can be attracted to and drowned in phials of sugar water or liquored water. One light task was to drive chickens, turkeys and turkey fowls through tobacco patches to consume worms. (Robert 1949, 67) (De Crèvecoeur 1986, 291-292) (Collingwood 1792, 416-418)

62. (Topsel 1658b, 670)

63. Consider the practice of disbursing payments for destroying vermin in Bedfordshire England recorded in parish records from the XVI through the XIX centuries. (Elliot 1936)

64."Men have ben [sic] forced to invent and finde-out many devises [sic] for the destroying of Wolfs [sic], for necessity hath taught men much learning, and it had been a shameful misery to indure the tyranny of such spoiling beasts, without labouring for resistance and revenge." (Topsel 1658, 574)

65. (Yentsch 1994, 220-222, 241)

66. "In practical fashion, his [Gov. Lord B.L. Calvert of Maryland] Upper House laid out an incentive system that would rid the countryside of predators - wolves, bears - and smaller varmints such as crows and squirrels. The plan was to pay a bounty of two lbs. of tobacco for squirrel scalps; 200 lbs. for wolves; and 100 lbs. for bears in Somerset County. Yet here one can see the tension created by societal interaction. The Lower House insisted: 'It must certainly be more Advantageous to have [squirrels] killed after [our] manner than to expend one million and 300,000 lbs. of tobacco per year in maintaining war against those little animals.' Their tobacco profits were not to be spent on frivolous measures, nor, in many men's minds, on his Lordship's councilors who helped institute a tobacco law partial to the large planters." (Yentsch 1994, 91) In Virginia, Acts were passed and repeatedly continued or renewed in 1769-1770 for killing wolves and destroying crows and squirrels. By 1770 a simple incentive program seemed insufficient, and legislators required heads of households to produce a requisite number of scalps according to the number of taxable individuals on their property. Acts passed at the most recent sitting of the General Assembly were reported in the Virginia Gazette newspaper and included, "An Act for further continuing and amending the Act; intituled, An Act for Increasing the Rewards for killing Wolves within certain Counties, to be paid by the respective Counties wherein the Services shall be performed." "An Act for destroying Crows and Squirrels in certain Counties therein mentioned." Dec. 28, 1769 p.2, col.3. Cited in (Purdie and Dixon, and Rind editions of the Virginia Gazette). The Act to destroy wolves, was further continued and amended (act first passed in the 5th year of HRM reign, amended now in the 7th) varied for some counties but in general about 50 lbs .of tobacco was awarded for a young wolf and 100lbs. for one older than 4 months. Jan. 25, 1770 p.1. Cited in (Rind edition of the Virginia Gazette). "An Act for destroying crows and squirrels in certain counties...because they do great damage to corn..." Act calls for the heads of households to produce at least 5 crows heads or squirrels scalps to the Justice of the

Peace annually per tithable or taxable individual for whom the head of house was responsible. The Justice of the Peace would destroy them to prevent their being reused for another bounty. Good records must be kept. Heads of households were fined 1 pound of tobacco for each head short of their requirement. The act was to be in force for 3 years. Jan. 25, 1770 p.1. Cited in (Rind edition of the Virginia Gazette). Act amended and continued for destroying of crows and squirrels act, also continued and amended wolf killing act and increased rewards. April 23, 1772 p.1. col.1. Cited in (Purdie and Dixon edition of the Virginia Gazette).

67. April 19, 1770. "Dolman destroyed a Crow's nest this morning with four young ones whose heads are saved for Northumberland [County] where we are taxed for Crows and squirrels heads every tithable. I have promised my people half a pound of meat for every six Crows heads which they will catch on Sunday next as they are now so easily to be taken in the nest. I wish I had an opportunity of writing to my Northumberland plantations to get this done. I am sure the hands there would amongst those pines catch a great many now they are so young." (Greene 1965, 390).

68. 14th c. strategy for wolves... "If you are in a region where there are wolves' dens, I will on your behalf instruct Master Jehan, your Steward, or your shepherds and servants, how to kill them without striking a blow, by the following recipe.

Recipe for a powder to kill wolves and foxes: Take the root of hellebore (this is the hellebore that has the white flower) and dry the root well, but not in the sun. Remove the earth and then make a powder in a mortar. Mix into this powder a fifth part of well-ground glass and a fourth part of lily leaf. Mix and crush all this together so that it can be put through a sieve. Take honey and fresh blood in equal amounts, mix them with this powder, make a paste that is stiff and thick, form large pieces the size of a hen's egg, cover these pieces with fresh blood, and put them on stones or little tiles in places where wolves are known to go. If he wants to use an old dead animal as bait, he can prepare it two or three days beforehand and throw the powder on the decaying carcass, without forming it into pieces." (Bayard 1991, 96-97)

Farm Accounts 1756-1757 includes purchase of one ounce "white arsenic to poison the crows." James Madison Sr's Account Book B 1755-1763, p.7. Cited in (Miller 1990, 19)

69. "They are very harmful, and will eat all manner of woollen garments, and if it were not for that discommodity, they were sweet-sportful beasts, and are very pleasant playfellows in a house." "Their skins are warm, their flesh is sweet but not very wholesome, their tails make good brushes, their fat rubbed onto a cloth is good for earaches, and otherwise their medicinal value is the same as the dormouse." (Topsel 1658, 510)

70. Squirrel plates, poems, etc., were advertised for sale in Norfolk by Balfour & Barraud "Figures for ornament...squirrels" July 25, 1766 page 2 col. 3 Virginia Gazette (Purdie and Dixon edition). Poem - "Death of a Squirrel" a young girl's lament on the death of her beloved pet squirrel, named "Phil." December 15, 1768 p.4 col. 1 Virginia Gazette,

(Purdie and Dixon edition),) Another "Death of a Squirrel" poem - a young lady bemoans the death her pet squirrel, named "Bunny". October 19, 1775 p.4 col.1 Virginia Gazette (Pinkney edition)

71. (Anon 1590) (Bateman 1971) (Smith 1768) (W.W. 1680)

72. (Morris 1981, 855)

73. (Peters 1988, 262)

74. (Peters 1988, 264)

75. Power, Tyrone. Impressions of America, during the years 1833, 1834, 1835. 2 vols. 1836 Reprint New York: Benjamin Blom, 1971, Vol. 1, p.71 (1833). Cited in (Garrett 1990)

76. In reference to Knotts Island/Peninsula in Princess Anne Co., lower Carolina, settlers reported that,. "In the miry condition it now lies, it feeds great numbers [of cattle] in the winter, though when the weather grows warm they are driven from thence by the mighty armies of mosquitoes, which are the plague of the lower part of Carolina as much as the flies were formerly of Egypt (and some rabbis think those flies were no other than mosquitoes)." (Wright 1966, 182)

77. "The buzzing of a mosquito is one of the most annoying sounds in nature." (Whayne 1990, 39)

78. Well before a complete understanding of how mosquitos operated as vectors of disease, people had developed associations between mosquitoes and malarial conditions. In fact, some referred to it as the "plague-fly." "The plague fly has received its name from the belief that its appearance marks the crisis in the prevalence of epidemic yellow fever. So uniformly is this true in Southern cities, that I have been told that negroes in those cities believe that this fly consumes - eats up - the morbific matter which constitutes the immediate cause of the disease." George D. Armstrong. The Summer of the Pestilence: History of the Ravages of the Yellow Fever in Norfolk, Virginia, A.D. 1855. Philadelphia, 1856, p.160. Cited in (Savitt 1978, 240)

79. September 1764 (Greene 1965, 278) (Garret 1990, 200)

80. (Beverley 1705, Book IV p.62)

81. In reference to pests in Virginia, Beverly reported the following:
Toads - not found in Virginia, frogs are but they do no harm but croaking.
Rattlesnakes - rarely seen in Virginia, and only a problem if you bother them, effective snakebite remedies are well-known even by servants
Mosquitoes - "Musketaes are a sort of Vermin, of less danger, but much more troublesom

[sic], because more frequent. They are a long tail'd Gnat, such as are in all Fens, and low Grounds, in England, and I think, have no other difference from them than the Name, Neither are the troubled with 'em any where, but in their low Grounds, and Marshes. These Insects I believe are stronger, and continue longer there, by reason of the warm Sun, than in England. Whoever is persecuted with them in his House there, may get rid of them, by this easy Remedy. Let him but set open his Windows at Sun-set, and shut them again before the Twilight be quite shut-in, and all the Musketaes in the Room, will go out the Windows, and leave the Room clear."

Chinches - "Chinches are a sort of flat Bug, which lurks in the Bedsteads and Bedding, and disturbs People's Rest a-nights. Every neat House-Wife contrives there, by several Devices, to keep her Beds clear of them. But the best way I ever heard, effectually to destroy them, is by a narrow search among the Bedding early in the Spring, before these Vermin begin to Nitt, and run about; for they lie snug all the Winter, and in the Spring large and full of Winters s Growth, having all their Seed within them; and so became a fair Mark to find and may with their Whole Breed be destroy'd."

Seed-Ticks - "are small Insects, that annoy People by day, as Musketaes, and Chinches do by Night: but both these keep out of your way, if you will keep out of theirs; for Seed-Ticks are no where to be met with, but in the track of Cattle, upon which the great Ticks fasten, and fill their Skins so full of Blood, that they drop off, and where ever they happen to fall, they produce a kind of Egg, which lies about a Fortnight, before the Seedlings Hatcht. These Seedlings run in Swarms up the next blade of Grass, that lies in their way, and then the first thing that brushes that blade of Grass, gathers off most of these Vermine, which stick like burrs, upon anything that touches them."

Red- Worms - "lie only in old Trees and rotten Loggs; and without sitting down upon such, a Man never meets with them, nor at any other Season, but only in the midst of Summer. A little warm Water immediately brings off both Seed-Ticks, and Red-Worms, tho' they lie so thick upon any part of the Body: but without some such Remedy, they are so small, that nothing will lay hold of them, but the point of a Pen-Knife, Needle of such like. And tho' nothing be done to remove them, yet the itching they occasion, goes away after two days." [description of chiggers] (Beverley 1705, Book IV p.63-67)

82. "In every country we commonly meet with a number of insects; of which many, though they be ever so small and contemptible, can do considerable damage to the inhabitants. Of these dangerous insects there are likewise some in *North America*; some are peculiar to that country, others are common to Europe likewise. I have already mentioned the Musquitoes as a kind of disagreeable gnat; and another noxious insect, the *Bruchus Pifi*, which destroys whole fields with pease." Dec. 9, 1748. (Kalm 1972, 205)

83. (Jones 1724, 25)

84. (Mouffet 1658, 953)

85. "Mosquitos. This is a Spanish word, signifying a Gnat, or Fly. They are very troublesome. Especially to strangers, whom they bite unmercifully, causing a yellow

coloured tumor, attended with excessive itching. Ugly ulcers have often been occasioned by scratching those swellings in persons of a bad habit of body. Though natives of the West-Indies, they are no less common in the coldest regions; for Mr. Maupertuis takes notice how troublesome they were to him and his attendants on the snowy summit of certain mountains within the arctic circle. They, however, chiefly love shady, moist, and warm places. Accordingly, they are commonest to be met with in the corners of rooms, toward evening, and before rain. They are so light, as not to be felt when they pitch on the skin; and, as soon as they have darted in their proboscis, fly off, so that the first intimation one has of being bit by them, is the itching tumor. Warm lime-juice is its remedy. The Mosquito makes a humming noise, especially in the night time. (Grainger 1764, Book I, verse 334, p. 25 note)

86. A description of the effects of fen gnats noted, "So home and to bed - being now pretty well again of my left hand, which was stung and very much swelled." July 20, 1661. (Pepys, 1970-1983, Vol. II p.138). "..the badness of the drink and the ill opinion I have of the meat, and the biting of the gnatts by night - and my disappointment in getting home this week - and the trouble of sorting all the papers, I am almost out of my wits with trouble." July 13, 1661 (Pepys 1970-1983, Vol. II p.135). "...and so to sleep till the morning - but was bit cruelly (and no body else of our company, which I wonder at) by the gnatts." Sept. 17, 1663. (Pepys 1970-1983, Vol. IV p.311). Travelers in the fenlands of England commonly commented on the "gnats" (i.e. "The humming gnatts, which is all the Towne Musicke they have." from Hammond, *Relation*. [1634] in Camden Misc. xvi. 90. Cited in (Pepys 1970-1983, 177 ftnote 1). The agues or malarial fevers endemic in the fen country were carried by mosquitoes which bred in the marshes until the drainage of the English fens in the eighteenth century. H.C. Darby. Draining the Fens. Cited in (Pepys 1970-1983, 177 ftnote 1).

87. "generally too hot to sleep in the nights; and Musketos excessive numerous. But the God of Mercy and goodness will relieve [sic] and protect us, especially those who with sincerity implore his Mercy." Aug. 11, 1777. (Greene 1965, 1124-1125). "Chantell; Lee [Richard Henry Lee 1732-94] his Lady and Children came here last night with the Chappawamsick Grey headed Beau just to count our Musketoes of which we now have millions, and they go away this morning as soon as they are up, which by the way is very late for such hasty travelers." "I cannot help observing now a days that the drier the weather is we have, the more musketoes. Certainly it must indicate a moist Atmosphere, though it is drye." Aug. 15, 1771. (Greene 1965, 613). "Rode out this morning, abundance Musketoes which spoiled the agreeable prospect of everything in great growth. However, that others might not complain too much of them and be idle I venture out and fight my way with bushes." June 19, 1773. (Greene 1965, 759). "It was yesterday almost too hot to live. I was forced to get again into my summer's cloathing and no bearing the musketoes." Sept. 23, 1773. (Greene 1965, 779). "A cloudy and still warm day with troublesome musketoes enough. Agues and fevers still very frequent." September 18, 1775. (Greene 1965, 944). "All Comfort more I must observe and rejoice in. Though we abound in Musketoes. Yet from dryness of the house They come in their swarms between

dark and daylight and then are gone the whole night [day?] from the house; A thing I never before remarked. Last night in Particular I became sensible of this. God be mercifull to us all and refresh the earth with his heavenly showers; to encourage growth, cool the air, and give life to the most miserable beings without such blessings." Aug. 14, 1777. (Greene 1965, 1126).

88. "The worst circumstance belonging to Greenspring [William Berkeley's 1649 estate near Williamsburg, Virginia on the James River] is the swarm of Muskitoes and Gannippers [probably gallinippers, crane flies] which at this season of the year torment Man and horses day and night. They rendered my stay perfectly miserable. " Aug. 5, 1796. (Carter 1977, 182). "Many of the first Virginian assemblies were held in the very room [at Greensprings] in which I plotted the death of Muskitoes, and many of their deliberations were directed to the same end in respect of the Indians, and for the *same reason* - they were *weak* and *troublesome*." (Carter 1977, 182-183). New Orleans - "The Muskitoes are so important *a body* of enemies, that they furnish a considerable part of the conversation of every day, and of every body; they regulate many family arrangements, they prescribe employment and distribution of time, and most essentially affect the comfort and enjoyment of every individual in the country." "To observe them minutely therefore is natural enough to an inquisitive mind, and in a long confinement in my room, I have had ample opportunity of becoming acquainted with them." "From January to the beginning of June the Muskitoes (here always called Marengouins) can well be borne. They are very troublesome appearing in moderate numbers, From June, and especially from the beginning of July till the weather becomes cold in October and November, they literally fill the air from sunset to sunrise, and in August and September they are troublesome even in the day time." (Carter 1980, 305). Latrobe described water pitchers that started out clear but soon had mosquito eggs laid in them and after a day or two had visible larvae in them. Apparently, no one cleaned them out or put a lid on the pitchers (Carter 1980, 306-307). "Most of the Muskitoes that infect the houses are thus bred in the rain water casks and wells, and when (as was the case in Philadelphia) the city shall be supplied with Water by pipes, the evil may probably be considerably lessened, at least in the city." (Carter 1980, 307).

89. Encounters with mosquitoes were so severe for some Englishmen that they resorted to drugs to induce sleep at night. "The factory is about 200 yards in circumference, and a most wretched place to live in, by reason of the swamp adjacent, whence produce noisome stinks, and vast swarms of little flies, called musketoes, which are so intolerably troublesome, that if one does not take, opium, laudanum, or some other soporifick, 'tis impossible to get any sleep in the night; and that once I lay there was the most uneasy that I ever felt, for I had not lain down above an hour in the factors bed, but I was so vex'd and tormented by those little malicious animals, that I was forced to get up again, and dress myself, put gloves on my hands, and tie a handkerchief over my face till daylight, which not withstanding these troublesome devils would sting thro', and the place so stung would be much inflam'd, and rise into a knob, much provoking the exercise of man's nails; and had King James the first, been there some time, he would have been convinc'd that

scratching where it itches was not the greatest pleasure in the world, as 'tis said was his opinion. The best means I can find to ally the inflammation, was to rub the parts affected with lime-juice, or vinegar, which, tho' for the present produced a smart, the ease it gave, in a short time, made abundant recompence; therefore to shun the spirit of this cursed little flie as much as we can, as well as to give us some cool air (that which is confin'd in a close space in this country, appearing as intensely hot to a European, as if he suck'd in the heat at the mouth of an oven in England), we have negro boys to fan us all night with large fans made of skins." (Dow 1927, 59-60)

90. "Little flies, which they [Indians] call *marignons*, annoy them often; to get rid of these vermin, they make small fires in their houses - especially under their beds. They say that these flies sting cruelly, and that those parts that are stung look like the flesh of lepers." Nicholas Le Challeux's narrative of Capt. Jean Ribaut's last voyage to Florida in 1565. Cited in (Lorant 1946, 94)

91. For an account of such episodes see (Mouffet 1658, 955).

92. "The English *Gnats* are not so stinging as others, nor do they raise so great pimples, but the lesser sort of them is more cruel, and yet they leave nothing behinde them but a little itching spot, like a flea-biting. The Gnats in *America*, especially those they call *Yetin*, do slash and cut, that they will pierce through very thick cloathing. So that it is excellent sport to behold how ridiculously the barbarous people when they are bitten will spring and frisk, and slap with their hands their thighs, buttocks, shoulders, arms, sides, even as a carter does his horses." Mouffet appears to be conflating Mosquitoes with some larger, slashing insect, like the Horse-Fly. This stands as the only recovered reference to the view that watching Native Americans fend off painful, aggressive insects constituted good entertainment. (Mouffet 1658, 955)

93. "The French in all Canada call the gnats Marangoins, which name, it is said, they have borrowed from the Indians. These insects are in such prodigious numbers in the woods round Fort St. John, that it would be more properly called Fort de Marangoins." (Kalm 1972, 382). Kalm points out that draining marshes and leveling woods, like they have done elsewhere, should reduce the number of mosquitoes in the area. (Kalm 1972, 382) "The inhabitants [of New York] are sometimes greatly troubled with Musquetoes. Their either follow the hay, which is made near the town, in the low meadows which are quite penetrated with salt water, or they accompany the cattle at night when it is brought home. I have myself experienced, and have observed in others, how much these little animalcules can disfigure a person's face during a single night; for the skin is sometimes so covered over with little blisters from their stings, that people are ashamed to appear in public." (Kalm 1972, 139) "I never saw the musquetoes (culex pipiens) more plentiful in any part of America then they are here [in New York, along the Hudson]. They were so eager for our blood, that we could not rest all the night, though we had surrounded ourselves with fire." (Kalm 1972, 352-353). "As soon as the sun grows warm, we are afflicted with mosquitoes, a species of insect which is very troublesome. Were they as large as they are

poisonous, no mortals could inhabit the country. They breed in ponds, lakes, rivers, and swamps." "The whole continent is subject to their stings..." "Their sting is much more offensive to some persons than to others. Woeful is the appearance of many Europeans I have seen who have been severely stung. Last year a gentleman from Manchester lodged here, and not withstanding all my care, there happened to be a few of them in his bedroom. Their stings fairly closed his eyes whilst Nature had wrapped them in sleep. He was blind for above eight hours. Others are totally insensible to their poison." (De Crèvecoeur 1986, 286) "I can't perceive how people endure them for it requires a perpetual exercise to drive them away, and very often it is no small totally insensible." A Lake Champlain hunting trip was interrupted by swarms of mosquitoes. On a visit to the seashore he recalls that the air was so thick with mosquitoes that his horse could not feed and he could not rest, his sleep that night was precluded by nasty gnats, "What is it that heat and moisture will not create?" (De Crèvecoeur 1986, 287) Author relates the tale of a farmer who punished his slave by tying him naked to a stake in a salt meadow. The slave subsequently died from millions of mosquito bites. "While there I was obliged to make a smoke in my room [to drive away mosquitoes], and this expedient prevented me from resting." "In the cultivated opened parts of the country, they are not so numerous. (De Crèvecoeur 1986, 288)

94. (Mouffet 1658, 953) "A dirty slash runs all along the back of it [a ditch behind town] which is a foul annoyance and furnishes abundance of that Carolina plague, mosquitoes." (Wright 1966, 207)

95. September 2, 1764 "...the wind now blows in fresh flows thence which I hope will drive off the Vile Musketoes which have during the prodigious heat been almost as plenty as bees in a hive; in short all our care could hardly keep them out of our rooms in the night which with the heat prevented all sleeping, at least very little of it was enjoyed." (Greene 1965, 278) April 28, 1766. "A great flight of Mosketoes the 25 and so they have continued. A fine Climate hardly one Month in a year without a frost at sometime though hot in the day; And yet hardly a month without those plagues." (Greene 1965, 292)

96. "In the 1860's, despite quinine's limited success Europeans were still attributing tropical fevers to miasma arising from soil, especially from marshes. The French in Algeria launched a major drainage program, an empirical form of mosquito control that also saved lives." Yellow fever is carried by a different species of mosquito than malaria. It is carried by Aëdes aegypti. They can live for up to four months and often dwell in the area of human habitations. Despite their short, 100 yards, flight patterns, they can easily survive long ocean voyages by sailing ship and reach North America or Europe. (Curtin, 1989, 65, 68) Aëdes aegypti is believed to have been imported to North America by way of slave ships in the late seventeenth century. The first documented case appeared in Brazil in 1642. At the turn of the twentieth century, Carlos Finlay, a Cuban physician, hab been insisting for years that mosquitoes carried yellow fever. However, Walter Reed is often credited with having made the connection in 1905. (Berenbaum 1995, 219-226)

97. Wortley, Lady Emmeline Stuart. Travels in the United States of America, 1811, 1812, 1813; Being a Memoir to Paul Svinin.... New York; William Edwin Rudge, 1930:122. Cited in (Garrett 1990)

98. William Byrd complained that "the mosquitoes bit me extremely" during an evening of dining and dancing at Greensprings Plantation, in Virginia. June 22, 1710. And that his "wife was indisposed for want of sleep, having been disturbed by mosquitoes." August 28, 1712. (Wright and Tinling 1941, 195, 576).

99. An instrument for driving away flies. Often made of peacocks feathers or other like materials bound together. (Mouffet 1658, 957)

100. Ingredients for the fumigations included Pomegranate Pills, Chamaeleon, Thistle, Lupines, Wormwood, Grist, Pine, Fleabane, Elcampane, Cedar, Radish, Cummin, Rue, Hemp, Dung, Galbanum, Castoreum, Feaver-stone, Harts-horn, Goats-hooves, Elephants Dung, Brimstone, Sulphur, Vitriol, Copperas and Ox Dung, and a vapor of strong Vinegar and Origanu. Control strategies included, burning a sponge soaked with vinegar, using an ointment of Wormwood and Radish Oil, sprinkling brine and soot around a chamber, dipping rue in a decoction of Fleabane and laying it in several corners of the house to kill pests, circling beds with green wet hemp to repel pests, anointting oneself with oil or the Manna of Frankincense to deter pests, and hanging horse hair from the middle of the door as a repellent. (Mouffet 1658, 953, 957)

101. (Mouffet 1658, 957)

102. (Power 1928, 174) (Bayard 1991, 66)

103. (Mouffet 1658. 95)

104. (Gates 1987, 16)

105. Fan citation Middlesex, VA Jan. 4 1767 Augustine Smith ordered 2 fans for a five year-old child, New Kent Sept. 26, 1771 Price Davies sent 3 fans to be new mounted, Cathn. Rathell in Williamsburg orders 6 white wedding fans. (Mason 1937, 23, 192, 218-219)

106. (Power 1928, 174) (Bayard 1991, 66)

107. "While there I was obliged to make a smoke in my room [to drive away mosquitoes] and this expedient prevented me from resting." (De Crèvecoeur 1996, 288)

108. "In the cultivated open parts of the country they [mosquitoes] are not so numerous. The only method made use of in some counties is the smoke, a remedy pretty nearly as bad as the disorder. A large smothered fire is made before the door as soon as the evening comes. I have often seen rings of such fires made and the cows brought into the middle

that the people might milk them." (De Crèvecoeur 1986, 288)

109. Lord Botetourt, Governor of Virginia, had 100 feet of fly lattice listed in his 1770 personal estate inventory, along with Venetian blinds, and gauze material covers to protect his glass chandeliers from fly-specks. (Hood 1991, 291) Lord William Campbell, Governor of Charleston, S.C., had listed in his inventory five mosquito hangings for tent beds. Dec. 1773. (Hood 1991, 304) In 1776 Robert Eden of Baltimore had in his inventory "Fly Netts made of white twine fringed." (Hood 1991, 299)

110. (Garrett 1990, 202)

111. (Garrett 1990, 200-202)

112. The beds had hangings and mosquito nets. (Barton 1909, Vol. I, 52)

113.(Garrett 1990, 200-202)

114.Penny royal, used since antiquity as a pest repellent, was still popular through the nineteenth century, "Remedy for Mosquitoes or Other Blood-Sucking Insects. Uncork a bottle of oil of penny royal, and it will drive them away, nor will they return so long as the scent of it is in the room. - Mrs. S.D." (Tyree 1879, 504)

115. Cited in (Gordon 1996, 99)

116. (Gordon 1996, 6)

117. (Morris 1981, 257)

118. (Gordon 1996, 20-22)

119. The Oriental cockroach (Blatta orientalis) likes the damp; the German cockroach (Blattella germanica) is not really German, it probably originated in equatorial Africa, it is an especially prolific and pestiferous variety; the Brown-banded roach (Supella longipalpa) arrived in North America in the middle of the twentieth century, most likely by way of troops returning from the Pacific theater at the end of the second World War, it is especially attracted to heat, appliances and electrical apparatus. (Berenbaum 1995, 254)

120. (Whayne 1990, 37)

121. "Roaches serve as mechanical vectors for many pathogens. Some serve as intermediate hosts for helminths. Some are associated with E. Coli and salmonella." The American cockroach *Periplaneta americana* is involved with human allergies, toxoplasmosis and Moniliformis moniliformis. The Australian cockroach *Piroplaneta australasiae* has been associated with toxoplamosis. The German cockroach *Blatella germania* is involved as a cause of human allergies, is an intermediate host for the

proventicular worm and globular stomach worm of poultry, associated with stomach worms of cats and dogs, and its transmits Toxoplasma gondii oocepts. The Oriental cockroaches *Blatta orientalis* has been associated with human allergies and as a mechanical vector of disease. (Weber 1984, 7)

"While pathogenic organisms, including fungi, bacteria, viruses, parasitic worms, and protozoans can be found on the bodies of cockroaches, they have never been directly implicated in the transmission of human infectious diseases. They nonetheless do present a health risk. Among other things, their association with filth means that they can physically contaminate food with bacteria, and they have been associated with transmission of *Salmonella* and other food borne illnesses." (Berenbaum 1995, 254-255)

122. (Weber 1984, iii, 7) (Gordon 1996, 83) (Peters 1988, 248)

123. (Gordon 1996, 100)

124. (Peters 1988, 248)

125. (Peters 1988, 248-249)

126. The Greek, Diophanes', roach remedy, "Get the Guts of a Ram fresh killed and full of dung, bury it in the earth where many Moths [cockroaches] use, and cast the ground lightly upon it; two daies after all the Blats [cockroaches] will gather to it; the which at your pleasure you may carry other where, or bury deep enough in the place, that they shall not be able to rise again." (Mouffet 1658, 1000) Cited in (Gordon 1996, 150) Mouffet suggested that one way to get rid of roaches was to "cast but a handful of Flea-bane..and all the Blats will gather to it." (Mouffet 1658, 1000) Cited in (Gordon 1996, 150). Flea bane, also called Blat-herb and Verbascum blattaria, is a kind of mullein believed to be powerful repellents by Mouffet and his peers. (Gordon 1996, 152)

127. (Gordon 1996, 161-162)

128.One modern author characterized many of the early roach control strategies as "ridiculous remedies." He considered incantations, spells, or prayers rooted in other cultures, folklore, belief systems or world views that differed from a modern western approach to pest control based in entomology, as superstitious. (Gordon 1996, 152)

129. "In the United States and Europe, chefs still barricade their work stations with cucumber peelings to ward off six-legged snackers." (Gordon 1996, 98)

130. "To Kill Cockroaches. - An infallible means to destroy them will be found in giving them the root of the Veratum vinex, commonly called black hellebore, which grows wild in our country marshy grounds, and may be got of our market people. Strew these roots about the floor at night, and next morning you will find all the family of the cockroaches dead or dying, from having eaten it, which they will do with much avidity. They will never fail to eat it while they can get it, and will as surely die. It causes them to foam at the

mouth, and to split in the back occasionally." (Miller 1806, 144)

131. "Cayenne pepper will keep the store-room and pantry free from ants and cockroaches. Mrs. S.D." (Tyree 1879, 503)

132. "To kill Cockroaches or Beetles. Strew the roots of black hellebore at night in the places infested, and they will in the morning be found dead or dying. Black hellebore grows in marshy places, or can be bought at herb stores. Poke root boiled soft, then sliced and laid on shelved will also cause them to disappear." Under "Misc." (Howard 1873, 373-374)

133.Fig. 1 Plate CIX, engraving by Scot and Allardice, "Blatta The Cockroach" (Dobson 1798, Vol. III, facing p. 792). The entry regarding Blatta orientalis provides very little physical or behavioral description compared to other entries in the encyclopedia, and no information regarding its origin or pest control strategies are included. (Dobson 1798, Vol. III p. 268)

134. The reader suggested the creation of a question and answer corner in magazine to address a variety of issues including, for example, the best method to get rid of cockroaches, "A good answer to either of these will be of more value to every housekeeper, than the solutions to all the riddles you may publish in a twelvemonth." (A. 1798, 140-141)

135. (Gordon 1996, 9)

136. "Moth" used in this context seems to have the sense of an insect that perpetrates damage, or is offensive. Not the same as current usage.

137. (Gordon 1996, 38)

138. (Gordon 1996, 37-38) "..a retainer to the Jakes [outhouses]; it creeps very slowly, but at the least glimpse of light, and whisper of talk, she hides herself; a shamefac't creature certainly, and most impatient of light, not so much for its ill favourdness, but the guiltiness of its conscience in regard to the stink it leaves behinde it, and its ill behaviour: for it frequents base places, and digs through other men's wals, and doth not only annoy those that stand near it, but offends al the place thereabouts with its filthy favour [savour?]." Although, it has a variety of important uses in medicines and Dye. (Mouffet 1658, 998-1000)

139. (Gordon 1996, 38-38)

140. (Gordon 1996, 10)

141. (Gordon 1996, 38)

142. (Gordon 1996, 10)

143. (Gordon 1996, 117)

144. Retitled Dissertation on Insect Generations and Metamorphosis in Surinam (Gordon 1996, 117-118)

145. (Gordon, 1996, 119)

146. "Cockroaches crawl displeasingly abroad: These, without pity, let thy slaves destroy; Like Harpies, they defile whate'er they touch:" (Grainger 1764, Book I p.26) "This is a large species of the chafer, or scariboeus, and is most disagreeable as well as destructive insect. There is scarce anything which it will not devour, and wherever it has remained for any time, it leaves a nauseous smell behind it. Though better than an inch long, their thickness is no ways correspondent, so that they can insinuate themselves almost through any crevice, &c. into cabinets, drawers, &c. The smell of cedar is said to frighten them away, but this is a popular mistake, for I have often killed them in presses of that wood. There is a species of Cockroach, which, on account of a beating noise which it makes, especially in the night, is called the Drummer. Though larger, it is neither of so burnished a colour, no [sic] so quick in its motions as the common sort, than which it is also less frequent, and not so pernicious; yet both will nibble peoples toe-ends, especially if not well washed, and have sometimes occasioned uneasy sores there. They are natives of a warm climate. The French call them *Ravets*." (Grainger 1764, footnote to Verse 337, Book I p.26)

147. Plate CIX, Fig. 1 "Blatta The Cockroach." Engraving by Scot & Allardice (Dobson 1798, Vol. 3, facing p. 792) Provides physical description and origin for 10 species of Blatta (Dobson 1798, Vol. 3, 268) An unusually long and detailed description of the Blatta Orientalis, which includes... "This species is frequent in America. They get into chests, etc., and do much hurt to cloathes; they infest peoples beds in the night, bite like bugs, and leave a very unsavoury smell behind them. They avoid the light, and seldom appear but in the night-time. The female resembles a kind of caterpillar; as it has no wings; she lays an egg of about one half the bulk of her belly. They eat bread, raw or dressed meat, linen, books, silk-worms and their bags [cocoons], etc., Sir Hans Sloane says, that the Indians mix their ashes with sugar, and apply them to ulcers in order to promote the suppuration." (Dobson 1798, Vol. 3, 268)

148. Consider, for example, the descriptions of insects in Dobson (engravings by Smither, 1798) Plate CCLXXIV of various insects, Libellula, Lernea, Lepisma p.312; Plate CCLXXV Lucanus/Stag Beetle facing p. 352 and described p.316.; and Mantis Plate CCLXXIX facing p.536 described p.547. (Dobson 1798, vol. 10) [Figure]

149. (Gordon 1996, xiv)

150. (Gordon 1996, xiv, 51) (Whayne 1990, 37)

151. Roaches presented a particular problem to sailors in the nineteenth and twentieth centuries who reported that they left a terrible smell, prevented sleep, destroyed provisions, crawled all over them, and ate their fingernails while they slept. Roaches present even more serious problems to modern travelers when they eat glue and other materials used in construction, wiring, and insulation on airplanes. (Gordon 1996, 41) Roaches have established themselves as one of the most significant pests in American homes in the late twentieth century. As one entomologist phrased it, "Cockroaches are exceedingly annoying from the mere fact of their presence and their disgusting proneness to get into things." (Herrick 1914, np) Cited in (Gordon 1996, xii) Americans spend millions annually on roach insecticides. Combat [manufacturers of commercially available pesticides] compiled the following 1994 figures for the sale of roach insecticides (in millions of dollars): Los Angeles 15, New York 10, Houston 7, Miami 6.3, Dallas 6.1, San Antonio 5.7, Baltimore 4.7, New Orleans 4.6, Tampa/St. Petersburg 4.5, Birmingham 3.5, Orlando 3.0, Atlanta 2.9, San Diego 2.5, San Francisco 2.3, Philadelphia 2.2, Phoenix 1.9, Chicago 1.8, Richmond 1.8, Raleigh 1.7, Jacksonville 1.7, Charlotte 1.3, Sacramento 1.1, Roanoke .83. (Gordon 1996, 29) Roaches are believed by many to be the most significant urban insect pests. They rank, along with the rat, as the major target for the majority of modern American urban pest control firms. (Peters 1988, 248) A roach was even found on board a space module. (Gordon 1996, 42) For more on cockroaches in the nineteenth and twentieth century see (Gordon 1996, 120-140)

152. (Morris 1981, 772)

153. Pediculus humanus L. has two distinct strains; the head louse which is generally located among the head hairs, and the body louse which usually lives in the seams of the human hosts' clothing, dropping off onto the body to feed. The pubic louse, Phthirus pubis L., lives predominantly in the pubic region. (Peters 1988, 259) (Berenbaum 1995, 203-205)

154. The itching is not only painful, the social unacceptableness of scratching bites, as well as the swelling and skin eruptions or discolorations, can make insect bites embarrassing. (Berenbaum 1995, 205-206)

155. Unlike fleas, lice do not transmit diseases to humans through their bite. They contract disease organisms, like typhus, by biting and feeding on an infected person. They pass it on to another person through their infected feces which they pass during feeding. The feces can infect a person by entering the bite wound or by being scratched into the skin by an itchy human host. (Berenbaum 1995, 206) The role of lice in spreading typhus fever was not established until circa 1909-1912. (McNeill 1977, 252)

156. (Berenbaum 1995, 202)

157. (Peters 1988, 260)

158. June 12, 1668 (Pepys 1970-1983, Vol. 9, 231)

159. Jan 23, 1669 (Pepys 1970-1983, Vol. 9, 424) In reference to his activities one evening, Pepys reported that he "had my head looked" [for lice] while traveling in Bristow [Bristol]. June 19, 1668 (Pepys 1970-1983, Vol. 9, 239)

160. "Thence to Westminster to my barbers, to have my periwig he lately made me cleansed of its nits; which vexed me cruelly, that he should put such a thing in my hands." July 18, 1664 (Pepys 1970-1983, Vol. V, 212) And, "Sent for Jervas my old periwig-maker and he did bring me a periwig; but it was full of nits, so as I was troubled to see it (it being his old fault) and did send him to make it clean;..." March 27, 166 (Pepys 1970-1983, Vol. 8, 133) And, "found Jervas the barber with a periwig which I had the other day cheapened at Westminister; but it being full of nits, as heretofore his work used to be, I did now refuse it, having bought elsewhere." April 4, 1667 (Pepys 1970-1983, Vol. 8, 146)

161. "A Liniment to destroy nits. Take oil of bays, oil of sweet almonds, and old hog's lard, of each two ounces; powdered stavesacre, and tonsy juice, of each an ounce; aloes and myrrh, of each a quarter of an ounce; the smaller centuary and salt of sulphur, of each a drachm: mix the whole in a liniment. Before you use it, wash the hair with vinegar." (Smith 1787, 181)

162. (Topsel 1658b, 788)

163. For Lice - "Take Salt water and rub the afflicted places with it or Vinegar, or Onyan [Onion], and mix in it Allum and Alloes and annoint the place. Alex." (W.W. 1680, 29). "Takes Hogs Lard, Quicksilver, and Sage Mix together to a salve and annoint the afflicted places. From an Italian. (W.W. 1680, 30). To Kill Crab Lice - Take a roasted Aple [sic] and take the Skin and Core from it, and beat it in a Mortar with as much quicksilver as will make it into an annointment and therefore dress the afflicted Places. From a good Friend." (W.W. 1680, 30.). "To Destroy Crab-Lice. Take transparent Aloe Succatrine, dissolve it in Rose-water, and wash the place affected with a cloth." "Another. Take Tobacco-leaves, steep them in Urine, and wash the parts where they Breed. Oyl of Spike does the same." (Pratt 1719, 43) This particular text is geared to a more genteel audience than the "Family Books."It was addressed to a Countess, and dedicated to the late Queen. These recipes to destroy crab-lice appear as the first entry under the heading, "Excellent Receipts in Physick and Chirugry"] For Nits and Lice in the Head - "3 ounces of Oyl of Olives, one ounce of wax, 3 drams of Stavosace, and as much quicksilver make a slave, annoint the head allover. A. Cornel. Aggripa." (W.W. 1680, 31). "Take the Flowers of Madlinwort, called in Latin Amarcanthus, boyle it in Lie [Lye] and wash the head. Bayrus. (W.W. 1680, 31). "Take Sandaracham or red Or pimment and Salt Peter of each a Dram, and Lice Erb [sic] [Stavesacre?] mix these with Oyl and Vinegar and annoint head. Bayrus. (W.W. 1680,32). To kill nits - "Make a Decoction of the Lye of Wormwood, Acorns, and Nuts, in strong wine Vinegar." (T.K. 1680, 22.) How to kill Lice - "Chase the place with

the juice of brine, mix'd with the Oyl of Anis, or of Juniper, or with a Decoction of Lice-herb, (Staphisagria). Or boil Bacon in a Leaded pot and white Frankincense, of each a like quantity, to the stiffness of a salve, strain it, and keep it for your use." (T.K.O. 1680, 22-23). Oil from Cedar - "It is excellent to kill Nits, Lice or any Insect crept into the Ear,.." (J.H. 1695, GU)

164. "A cure for Worms, and Cutaneous disorders. Take four ounces of pure quicksilver, boil it in a glazed pipkin, in a quart of soft water one hour; pour it off and bottle it up for use. Boil the same quicksilver again in the like quantity of water as often as you need a supply. Children may drink of it, and without fear, a gill at a time (for whom it may be sweetened with honey and sugar, to make it palatable) while adults may drink thereof as indifferently as plain water, night and morning, the first and last thing they do, for a week or two; after which, purge off the dead worms, that they may not lay and rot in the body, with as many grains of powder of jalap-root, mixed up in a little worm herb tea, or small beer, as the patient is years old under thirty; and if the smallest quantity proves not brisk enough, the dose may be doubled the next time of taking it, as occasion requires, working all off by drinking either worm water gruel, mutton broth, or common tea; if it has worked itself once, as is usual in taking other purges. Outwardly wash the parts afflicted with some of this medicinal water warmed, with a linen rag, or spunge every night at bed-time, till the skin is perfectly close and smooth. The leaves of staves-acres powdered, and strewed on the head, or elsewhere, will certainly kill lice; but the safe lotion will destroy all kinds of whatever breed upon the body." (Saunders 1750, 125-126)

165. In reference to changing clothes, one author warned that frequent clothes changes by servants aroused suspicions of thievery, while infrequent ones caused problems with body pests, "Though shifting too oft be a theefe in a house,/ Yet shift slut and slouen [sic] for feare of a louse." (Tusser 1580, verse 11, #86, 176)

166. One potential exception appears in Chomel's 1725 Encyclopedia. Although not technically a work of prescriptive literature, the author does advise readers under his entry for the heavy metal mercury that it will kill lice, fleas, and other insects. He recommends mixing it with hogs-grease and rubbing it on the head, arm-pits, other body parts, or "in the folds of your Linnen and Cloths" to destroy vermin that infest human bodies. (Chomel 1725, MER/MET)

167. Jan 23, 1669. (Pepys 1970-1983, Vol. 9, 424)

168.In reference to a man lost in Great Dismal Swamp [located in the area of the current Virginia and North Carolina borders], "He told us a Canterbury tale of a North Briton whose curiosity spurred him a long way into this great desert, as he called it, near twenty years ago, but he, having no compass nor seeing the sun for several days together, wandered about till he was almost famished, but at last he bethought himself a secret his countrymen make use of to pilot themselves in a dark day. He took a fat louse out of his collar and exposed it to the open day on a piece of white paper, which he brought along

with him for his journal. The poor insect, having no eyelids, turned himself about till he found the darkest part of the heavens and so made the best of his way toward the North. By this direction he steered himself safe out and gave such a frightful account of the monsters he saw and the distresses he underwent that no mortal since has been hardy enough to go upon the like dangerous discovery." (Wright 1966, 190-191)

169. (Morris 1981, 501)

170. "Larvae are whitish to cream colored worms with chewing mouth parts and no external legs. They always develop off the host, feeding on organic waste or excreta of adult fleas, mice, rats or other rodents. They thrive in humid areas. Larval growth is normally completed in one to five weeks, but may extend to six months or longer. There are three larval phases. Survival is dependent on temperature and humidity. Treatment of the premises to control the larvae is an important factor in flea control. The pupa stage may be dormant for months or years. This state is sensitive to mechanical disturbances which cause them to hatch. This explains flea attacks or people being attacked upon entering an unoccupied building. Adult fleas are exclusively blood suckers (Hematophagous). Adult fleas emerging from the pupa stage can survive for months without a blood meal. Female fleas require a blood meal before laying eggs. The female lays 4 to 8 eggs after each blood meal up to about 18 per day. When hosts are near, a flea may feed several times a day. Unfed adults have been kept alive as long as two years." (Weber 1984, 1)

171. For example, survival rates for the following species, fed and unfed, are as follows: Human Flea *Pulex irritans* 513 days fed, 125 unfed; European chicken flea *Ceratophyllus gallinae* 345 days fed, 127 unfed; Dog flea *Ctenocephalides canis* 234 days fed, 58 unfed; Northern Rat Flea *Nosopsyllus fasciaties* 106 days fed, 95 unfed; Oriental Rat Flea *Xenopsylla cheopis* 100 days fed, 38 unfed. (Weber 1984, 1)

172. *Ctenocephalides felis* - associated with flea bite dermatitis, murine typhus, dipylidiasis and hymenolepiasis. It stays with the host most of the time. It is more common on dogs than the dog flea, and it readily attacks humans as well as chickens. (Weber 1984, 2)

173. *Ctenocephalides canis* - associated with dipylidiasis, human olepiasis and murine typhus. Attacks humans as well as dogs and cats. (Weber 1984, 2)

174. *Pulex irritans* - is a vector of dipylidiasis, hymenolepiasis and plague. It attacks humans, dogs, cats, swine, goats rats and mice. They can jump 13 inches. (Weber 1984, 2)

175. *Nosopsyllus fasciatus* - a vector of plague, murine typhus, and on occasion for both the dwarf tapeworm *Hymenolepis nana* and the mouse and rat tapeworm *Hymenolepis minuta*. It is the predominant flea on rats in the United States and is associated with humans, rats, mice, pocket gophers and other rodents. (Weber 1984, 2)

176. *Xenapsylla cheopis* - the most important flea in transmitting plague and murine typhus from rats to humans. It is also a vector of trichinosis and hymenolepiasis. They are found wherever black rats are found and are also referred to as the domestic rodent flea. (Weber 1984, 2)

177. (Weber 1984, 2)

178. (Whayne 1990, 40)

179. (Wigglesworth 1976, 36) "In 1894 the causative agent for plague was shown to be a bacterium, *Yersinia pestis*, and a year later the role of rats as hosts was established." "In 1898 transmission of the plague bacillus by fleas was determined." "Thus we have a case where a human is substituted as the host for a disease essentially of another type of animal." "Plague bacilli multiply in the flea gut and block movement of materials. The hungry flea regurgitates during its repeated subsequent attempts to feed and thereby can inoculate several hosts (rat or human) before the temporary obstruction of the gut breaks down." "A second form of plague, the pneumonic type, is a disease of the lungs, transmitted directly by sputum from one human to another, but this usually follows an outbreak of the bubonic type. A third type, septicemic plague, involves the blood and may be picked up through the mucous membranes or through a break in the skin." (Peters 1988, 280-281) "Miasma, or poisonous air, was thought to be responsible for the spread of contagion during the first and even second [fourteenth and seventeenth centuries] pandemic." Not until the early twentieth century was a connection to the flea proven and accepted officially. (Berenbaum 1995, 218)

180. (Hole 1953, 94)

181. (Hole 1953, 94)

182. (Peters 1988, 261)

183. "And in the summer take heed that there be no fleas in your chamber, nor in your bed, the which you may do in six ways, as I have heard tell. For I have heard from several that if the room be strewn with alder leaves, the fleas will be caught thereon. Item I have heard tell that if you have at night one or two trenchers (of bread) slimed with glue or turpentine and set about the room, with a lighted candle in the midst of each trencher, they will come and be stuck thereto. The other way that I have tried and 'tis true: take a rough cloth and spread it about your room and over your bed, and all the fleas that shall hop thereon will be caught, so that you may carry them away with the cloth wheresoe'er you will. Item, sheepskins. Item I have seen blankets (of white wool) set on the straw and on the bed, and when the black fleas hopped thereon, they were sooner found upon the white, and killed. But the best way is to guard oneself against those that be within the coverlets and the furs, and the stuff of the dresses wherewith one is covered. For know that I have tried this, and when the coverlets, furs or dresses, wherein there be fleas, be folded and

shut tightly up, as in a chests tightly corded with straps, or in a bag well tied up and pressed, or otherwise put and pressed so that the aforesaid fleas be without light and air and kept imprisoned, then they will perish forthwith and die." (Power 1928, 173-174) Slightly different translation cited in (Bayard 1991, 65-67)

184. "I have had a bad night's rest tonight, not sleeping well, as my wife observed, and once or twice she did wake me; and I thought myself to be mightily bit with fleas, and in the morning she chides her maids for not looking the fleas a-days. But when I rise, I find that it is only the change in the weather from hot to cold [which impedes sweating and makes him itch]" Sept. 3, 1664. (Pepys 1970-1983, Vol. V, 260) In reference to fleas that attacked his traveling companion and not him, Pepy reported that, "In the morning, concluding him to be the eldest blood and house of the Clerkes, because that all the fleas came to him and not to me." April 25, 1662. (Pepys 1970-1983, Vol. III, 70)

185. "Lay a small piece of wood as big as a man's Arm rubbed with Hog's grease in center of room to attract Fleas. Take blood of bare or badger put under bed as before [in a broad shallow earthenware platter]." (W.W. 1680, 28-29)

186. (Berenbaum 195, 217)

187. "To Kill Fleas: Wormwood, root of wild Cowcumber, boyle them in pickle, and sprinkle it in the room. Take Malenthium steeped in water 3 or 4 days then sprinkle the room with it. Sope Lees boyle 2 or 3 onyons in it, let cool then sprinkle room with it. Mustard-seed boyle it with herb Daphines and water, sprinkle room with it." "Also, lime beaten to powder; Lie and Goat's milk; Lees of Oyl; Wormwood, Eve Averon, Nut Leaves, Lavender, and Green Colliander put under the bed and pillows; Wormwood, Lavender, Nut Leaves, boyle them in Vinegar and sprinkle blanket; To gather all the fleas together that are in a room - take an earthen pot and cut a hole in the floor of the room, so big as the pot may stand with the mouth even with the floor of the room, then take the blood of an ox, and mix it with the soot of the chimney, rub it inside pot, all the fleas will come. (W.W. 1680, 24-27)

188. "Useful Family Receipts. To Destroy Fleas. 1. Rub a small stick with the grease of a hedge-hog, and fix it in the middle of the room, and all the fleas, as some say, will flock to it and perish. 2. Water the room with lye and goat's milk mixed together. 3. Put copperas or vitriol in a pail of water, when it is dissolved water the room with it." (Fisher 1750, 78).

189. (Kalm 1972, 206)

190. Travelers reported the following conditions of their travel accommodations in Pennsylvania."Again I had near been all over bemeasled with the Fleas - fleas biting! - Bugs crawling! On a hard Board surrounded with a snoring Family!" [Although he thanks God that at least he is alive] Mon. July 24, 1775. (Albion 1934, 68). "I slept sound and fine without being disturbed by either a Bugg or a Flea And the House is as mean, and as

much surrounded with Woods and Brush as other Houses where through entire Carelessness, I am wounded by numberless Numbers of these leaping insects." Teus. July 25, 1775 (Albion 1934, 69). "Ten hundred thousand flies - O! I fear there are as many Fleas. Seize me soon, kind Sleep; lock me in thy sweet Embrace before these Vermin hurt me - O! So soon as I lay down, let me rest on thy Bosom and lose my Senses - Stop! O Stop - Sleep tonight is gone -! Mon. July 31, 1775 (Albion 1934, 82-83)

191. PULEX - insects, (fleas); "familiar sort of vermin," a pleasing object under a microscope, "This blood-thirsty insect, which fattens at the expence of the human species, prefers the more delicate skin of women; but preys neither on epileptic persons, nor upon the dead or dying." The author also provides a detailed description of several species of fleas' physiology and behavior, and relates tales of trained flea and cultures in which the fleas are revered. He concludes with a list of suggested remedies to destroy fleas; Mercurial ointment, brimstone, a fumigation with the leaves of penny-royal, or fresh-gathered leaves of that plant sewed up in a bag, and laid in the bed, are remedies pointed at as destructive of fleas. (Dobson 1798, Vol. XV, 642-645)

192. "The inquisitive researches of the naturalist, that ascertains the propagation of the most minute species through animated nature, blend utility with pleasure, in accounting for the progress and improvement of profitable as well as pernicious existence." Re: fleas (- 1793, 150) The author observed that fleas lay eggs, not live births as previously claimed, that eggs were only laid in certain environments that were not necessarily the same as the ones adult fleas preferred, and theorized about how eggs are laid. Author argued that the utility of his investigation was the discovery that, "to prevent the production of these troublesome visitors toward the beginning of summer; which end is most likely to be answered by attending to the cleanliness of the linen bottoms used in bedsteads, which from what was said before, are the most likely repositories of the ovaria of these vermin; therefore the rubbing them hard about the month of April, with a brush moistened with some spirituous liquor, seems to be the most probable means of destroying them." Re: fleas (- 1793, 150-151)

193. "Recipe for preventing that troublesome insect, the FLEA, infesting persons, rooms or beds. Take a few branches of penny-royal, and hang it up in the room, lay it on or near the bed, or carry a few sprigs in the pocket, and the Flea will never make its appearance. This simple preventative has never failed of the desire effect." Re: flea (- 1803, 143)

194. "These are the same back-biters cried I, seizing one of them with fury, that above all other nettles I detest - and I put you to death, added I, killing him in the name of my back-biter Mr. ****, and instantly another of them seizing upon my backbone, gave me a devil of a mangle - I snatched at him with my fingers, but he eluded me with my grasp, bouncing at a greater rate till I fortunately caught him - and now you wretch, cried I, thus do I destroy you; and this cried I, catching another of them, is Mr. ****, and this Mr. ****. I am not naturally cruel, but the biters of these skippers fixed my imagination, and similitude between fleas and them, made me terribly fierce: Ah, said I, perhaps 'tis my own fault, that

milk of human nature and my mother - if my blood was not so sweet, the wretches would not attack me,'tis the sweetest fruits the birds have been picking at." Re: battle of the fleas (- 1796, 2)

195. (Peters 1988, 266)

196. "A sort of flat bug which lurks in the bedsteads and bedding and disturbs people's rest a nights' became, naturally, the bedbug." (Hawke 1988, 102)

197. (Morris 1981, 234) "I was very unwell last night, high fever...felt Chinches in bed..." "Had bedsteads taken down Scalded &c...." "The Diary of Francis Taylor, of Orange County, Virginia," MS in the Archives of the Virginia State Library. Vol. 13. August 8, 1799. Cited in (Blanton 1931, 418)

198. (Davidson 1982, 128-132)

199. (Kalm 1972, 207-208)

200. Stiverson and Butler eds. Travel Journal of William Hugh Grove pp. 22-23. Cited in (Garrett 1990, 207)

201. (Kalm 1972, 207-208)

202. Bed bug poisons - Fresh Tar mixed with juice of wild Cowcumber, let stand, annoint bedsteads with it and all the Buggs will die; Rub bedsteads with Squilly [Red Squill?] powder mixed with best Wine Vinegar. Sponge on to kill bedbugs; Mix Gall of Ox with Vinegar and rub the cracks and joynts of the bedstead and the bugs will die; Brimstone and old Oyl used as before; Boil strong Glew with Vinegar and rub the bedsteads and bugs will die; Dregs of Oyl and Gaull of Ox; Henderain bruised with Oyl and rubbed on joynts; Wormwood, water, oyl, Rue, sheep suit [suet] [elaborate preparation] anoint bedstead; Quicksilver mixed with hogs grease as before; flush out with smoke of burning brimstone and wax; wormwood and white hellibore boiled together use as before. (W.W. 1680, 19-23) "An infallible Receipt to destroy Bugs. To every ounce of quicksilver put the whites of five or six eggs, mix them, and beat the well together in a wooden dish with a brush, till the globules of quicksilver are just perceptible; and then after having taken the bedstead to pieces, and brush'd it very clean from dust and dirt (without washing) rub into all the cracks and joints the above mixture, letting it dry on; nor must the bedstead be washed at any time afterwards: by the first application they will in most places be destroy'd; if not, a second will not fail destroying them entirely." (Smith 1739, 346) [This edition is largely the same as 1742 Williamsburg, Virginia edition of the book, and (Smith 1753, 371)] The granddaughter of Confederate General Thomas Jonathan "Stonewall" Jackson recalls that her grandmother practiced this same procedure in the nineteenth century. Her grandmother, "only went into the kitchen once a year for a remarkable ritual of beating up egg whites with quicksilver so that an old black woman could come and dab them on mattresses with a feather in order to ward off bedbugs." (Brown c.1980, np)

203. "To destroy and prevent Buggs and other Vermin, by Mr. Salberg, Member of the Academy of Sweden. Mix with the solution of vitriol the pulp of Coloquintida, and apply the mixture to all the crevices which serve as a nursery to vermin; the solution alone has proved effectual, but if applied to stone or brick walls, it may be mixed with lime, which will give it a lively yellow, and insure its success. The boiling any kind of wooden work in the solution of vitriol, effectually prevents it from taking the worm, and preserves it from rottenness and decay." (Saunders c.1750, 5-6)

204. For example, "Useful Family Receipts," cleaning section: "To destroy Bugs. 1. Take oil of turpentine, and with a brush wash over the bedstead and the nail-holes, chinks, &c. it will kill both bugs and knits [sic]. 2. Paint the bedstead over with verdigrase ground in linseed and turpentine oil, and the bugs will not harbour in it. 3. Take common oil and water, in which boil wormwood and rue, till the water is consumed, then strain it and mix it with a good quantity of grease, of which making an ointment, rub with it the chinks and joints of the bedstead." (Fisher 1750, 78)

205. "The cimex lectularis or house-bug, is particularly acceptable to the palate of spiders, in general, and is even sought-after by wood-bugs; which is not indeed surprizing [sic], when the general voracity of this genus is considered. The methods of expelling house-bugs are various, as oil of turpentine, the smoke of corn-mint, of narrow-leafed wild-cress, of herb robert, of the reddish agarie, of mustard, Guinea pepper, peats or turf, &c." (Dobson 1798, Vol. 5, 10-11)

206. "A Collection of approved Receipts, very necessary to be known in all Families...To destroy bugs. Take a half pound of quicksilver, and kill it with two ounces of venice turpentine; then put it into a pound of hog's lard, and mix it well in a mortar; annoint the joints of the bed with it with a brush; take care and do not touch your fingers. If they are in the walls, mix it with the white-wash made hot. Or, take oil of turpentine, and with a small brush wash over the bedstead, and all nail holes, chinks, &c. and it will immediately kill both bugs and nits. Or, take ox-gall and hemp-oil; mix them together, and rub the joints and bedstead with it, and the bugs will never come near the places you have rubbed." (Waller 1763, Vol. II, No.2 February, 61-61)

207. Under "Directions for Painting Rooms or Pales," "A Receipt for Destroying Buggs. Take the highest rectifi'd spirit of Wine, viz. (Lamp Spirits) that will burn away dry, and leave not the least moisture behind, half a Pint; newly distil'd Oil, or Spirit of Turpentine, half a Pint; mix the together and break into it, in small Bits, half an Ounce of Camphire which will dissolve in a few Minutes; shake them well together, and with a Piece of Spunge, or a Brush dip't in some of it, wet very well the Bed or Furniture wherein those Vermin harbour or breed, and it will infallibly kill and destroy both them and their Nits, although they swarm ever so much: But then the Bed or Furniture must be well and throughly wet with it, (the Dust upon them being first brushed and shook off), by which means it will neither stain, foul, or in the least hurt the finest Silk or Damask Bed that is. The Quantity here ordered of this curious neat white Mixture, (which costs but about a

Shilling) will rid any one Bed whatsoever, tho' it swarms with Bugs" Do but touch a live Bug with a Drop of it, and you will find it to die instantly. If any Bug or Bugs should happen to appear after once using it, it will only be for want of well wetting the Lacing, &c. of the Bed, of the Foldings of the Linings or Curtains near the Rings, or the Joints or Holes in and about the Bed, Head-board &c. wherein the Bugs and Nits nestle and breed, and then their being well wet again with more of the same Mixture, which dries in as fast as you use it, pouring some of it into the Joints and Holes where the Spunge cannot reach, will never fail absolutely to destroy them all. Some Beds that have much Wood work, can hardly be throughly cleared, without first being taken down; but others that can be drawn out, or that you can get well behind, to be done as it should be, may. Note, The Smell this Mixture occasions, will be all gone in two or three Days, which yet is very wholesome, and to many People agreeable. You must remember always to shake the Mixture together very well, whenever you use it, which must be in the Day-time, not by Candle-light, lest the subtlety of the Mixture should catch the Flame as you are using it, and occasion Damage." (Smith 1742, 227-228). No other receipt for anything else in this book included such detailed preparation and use instructions, or references to the dangers and virtues of the product. The same receipt was cited in in (Smith 1753, 370-371)]

208. "Said CLARK [Thomas Clarke, Virginia merchant] has for sale an INGREDIENT for destroying BUGS and FLEAS." (The Virginia Centinal; and the Winchester Mercury, Virginia, June 4, 1788, 3-4"

209. "D-n (Damn) the Bugs and Chinches says Ben [Carter's son] rolling over on the Bed, and rubbing his Eyes, I have slept none for them - Mr. Fithian, do you rest any o-Nights? Don't these cursed Bugs keep you awake?" - "No Sir; for you see I commonly sit and read til half after ten or eleven - So that by the Time I lay my poor Skin and Bones on the Bed, I am so much fatigued with the tumultuous Business of the Day, and the Study of the Evening that my sleep the rest of the night is sound and unbroken-" Saturday, July 9 1774 (Farish 1945, 178) Re: a hot night with his sleep troubled by bedbugs [mocking] "Indeed I enjoy this fine cool weather, says Ben as he lay on his Back in the Bed rubbing his Eyes and Ears about half after six o'clock; Lancelot Lee had never I am sure, more sensible Pleasure in swallowing a well prepar'd Dinner - To be sure I have slept last Night with the sweetest composure in spight [sic] of the Chinches, and in spight of my Disorder!" "Get up, Lump of Indolence, said I to him; Get up and clap to Virgil instead of lying there and boasting-" Tuesday 12 July 1774 (Farish 1945, 182) Bob Carter [Robert Blanden Carter] Carter's son said; "Such a night I never spent before - The Heat says he, and these cursed Chinches made me intirely [sic] restless-" Monday, July 18, 1774. (Farish 1945, 192) While Philip Vickers Fithian was traveling in Piscataway he reported, "For company all the night in my Room I had Bugs in every part of my Bed-" Fryday 27 May 1774 (Farish 1945, 146)

210. "Furthermore, the fashionable feather beds in many homes induced bedbugs to multiply. Insects swarmed all over food and it was not unusual after drinking to find one or more dead ones at the bottom of a goblet. Elder-flower powder was sprinkled liberally

over rice, wheat, fruit, and bed sheets as an insecticide to kill ants, moths and weevils." Margaret Hill Morris, New Jersey, 1737-1816. Cited in (Evans, 1975, 107-108)

211. "Sir I observed in your Magazine for July, 'An easy method to prevent the increase of bugs,' and was much pleased with the ingenuity of the contriver; but am apt to think the difficulty of procuring the 'glass pedestals' will be, in many cases, insuperable; especially in places a great distance from capital towns. Besides this I have another objection to make against the method proposed which is that it offers only a *partial* remedy. Suppose the increase of bugs is prevented, what are we to do with the capital flock? Not keep them to fatten upon us, I hope; that I can never consent to: - for my part I am such an enemy to them that I wish to have the whole breed destroyed, and therefore I will tell you how my wife (who is of Low Dutch extraction) keeps my house clear of them. Her method is very easy and simple, and the means she uses may be found in every part of the country, - in short, Sir, *Cleanliness* is the grand specific; and I beg you will tell your readers that if they will do as my wife does, that is to say, if they will keep their houses clean, - take down their bedsteads every spring and fall, and let then be well scalded, - they will never be troubled with bugs." (Americanus 1775, 361) Re: letter to which Americanus refers - "It is well known that bugs, especially in the winter, entrench themselves securely in the wainscot and floors of rooms, where they remain till the warm season, at which time they quit their winter quarters, and take possession of the bed and bed furniture. Now if the communication could be cut off between the beds and the floor and wainscot, these gentry, Like Ge. Gage's army, by being excluded from fresh provisions, would be starved out. The following method will effectually do it: Cut about a foot off the bottom of each bed post, and place glass pedestals in the room of the part so taken off. The feet of bugs not being glutinous, like those of flies, they cannot ascend the glass; and if the head of the bed be removed a few inched from the wall or wainscot, it will be secured from fresh invaders. To judge of the probability of this method, put a bug on a looking glass, or on any picture which has a glass; and though he will travel fast while it lies flat, yet as soon as you raise it perpendicular he has no hold, and instantly falls." (- 1775, 305)

212. Re: five young ladies' accommodations at an inn in Sweet Springs, Virginia, "Another insisted in being settled in the new part of the building, lest there should be animalculae in the walls of the old. In all the rooms they pulled up the bedclothes, and peer anxiously, but knowingly, into the holes in the four posts." (Mackie 1864, 36-37) "To Destroy Bedbugs, Dissolve one ounce corrosive sublimate in one pint strong spirits. Put it on the bedsteads with a feather, and it will destroy the bugs and their eggs also. - Mrs. Dr. P.C." "Bed bug Poison. Alcohol, two and a half pints; camphor, one ounce; spirits turpentine, one ounce; corrosive sublimate, half an ounce. Mix and dissolve. If the scent is not objectionable, two ounces commercial carbolic acid will greatly improve the above. Dr. E.A.C." " To Destroy Bugs, Ants, Etc. Dissolve two pounds alum in three quarts boiling water. Apply boiling water with a brush. Add alum to whitewash for storerooms, pantries, and closets. It is well to pound alum fine and sprinkle it about beds infested with bugs. Mrs. S.T." (Tyree 1879, 503)

213. (Morris 1981, 858)

214. (Topsel 1658, 392)

215. (Topsel 1658, 393)

216. (Topsel 1658, 393)

217. (Topsel 1658, 420-422)

218. (Topsel 1658, 394)

219. For example, the fable of Ipicrates, "The followed me that detestable baud, swearing by Diana, and Persaphatta, that she was as a Heifer never touched, as a Virgin never stained, and as a Colt never covered, but the truth is, she was as a good as a Maid as a Mouse." (Topsel 1658, 394)

220. "But concerning their manners, they are evil, apt to steal, insidious, and deceitful: and men also which are of the same disposition with these beasts, fearing to do anything publickly, and yet privately enterprise many deceits, are justly reproved in imitation of such beasts." (Topsel 1658, 395)

221. (Topsel 1658, 395)

222. (Topsel 1658, 395)

223. (Topsel 1658, 396)

224. (Topsel 1658, 422)

225. "I do adjure all ye Mice, which do remain or abide here, that ye do not offer me wrong, or suffer me to be wronged of any other. For I do assign and appoint you this field (then he nameth the field) in which if I should surprize you hereafter, I call Luna to witness, I will tear every one of you into seven pieces: When as thou hast writ this charme, binde paper fast to the place wherein the Mice haunt, and there before the rising Sun: so that the characters or marks may appear on the outside cleaving to as a natural stone of that place." (Topsel 1658, 422)

226. . (Topsel 1658, 422) Re: the medicinal value of field mice - a salve made of their ashes and honey helps restore eyesight. (Topsel 1658, 422)

227. (Feild 1984, 195)

228. (Feild 1984, 195)

229. (Morris 1981, 1082)

230. An Inventory of Robert Beverly recorded February 18, 1734/5. "2 banks of Rat Eaten Shoe Thread of no Value" (Spotsylvania County Will Book A 1734/5, 246-250)

231. (McNeill 1977, 110-111)

232. "The rats are so multiplied that no one can imagine the great quantities of grain they destroy every year. Some farmers, more unfortunate than others, have lost half of their crops after they were safely lodged in their barns. I'd forgive Nature all the rest if she would rid us of these cunning devouring thieves which no art can subdue. When the floods rise on our low grounds, the mice quit their burrows and come to our stacks of grain or to our heaps of turnips, which are buried under the earth out of reach of the frost. There, secured from danger, they find as a habitation replenished with all they want. I must not, however, be murmuring and ungrateful. If Nature has formed mice, she has created also the fox and the owl. They both prey on these. Were it not for their kind assistance, [the mice and rats] would drive us out of our farms. Thus one species of evil is balanced by another; thus the fury of one lament is repressed by the power of the other. In the midst of this great, this astonishing equipoise, Man struggles and lives." (De Crèvecoeur 1986, 297)

233. (Yentsch 1994, 113)

234. Excavations at the Calvert Site in Annapolis, Maryland revealed rat tunnels in the area where the hypocaust was located in an orangery. Archaeologists determined that the area had been a haven for rats for centuries. (Yentsch 1994, 117)

235. La Quintinie, J. de. A Treatise on the Culture of the Orange Tree. London, Matthew Gillyflower, trans by John Evelyn, 1693, p.22. Cited in (Yentsch 1994, 117)

236. One fourteenth-century husband's instructions to his wife included suggestions for rat control: "if your household servants report that rats are spoiling your grain, bacon, cheese and other supplies, tell Master Jehan that there are six ways he can kill them: first, by having as a good supply of cats; second, by rat traps and mousetraps; third, by traps made of small planks propped up on sticks, which good servants make; fourth, by making cakes of fried cheese and powdered aconite and putting these in their holes where they have nothing to drink; fifth, if you can't keep them from finding something to drink, it is well to cut little pieces of spunge and then, if they swallow them or drink they will soon swell up and die; sixth, take one ounce of aconite, two ounces of good arsenic, a quarter of a pound of pork-fat, a pound of wheat flour, and four eggs. Make bread of this, cook it in the oven, cut it in strips, and fasten it down with a nail." (Bayard 1991, 97-98)

237. For example: To make rats and Mice Blind; Tithymalum beaten to powder sift through a fine fire, mix with wheat flour and Mitheglen to make paste (makes them "beatle blind"). Burn Majorum to chase them out. Carry skinned head of a rat or mouse to infected areas and they will flee. Take stone tiemalites or herb Merica to places and they

will depart. Fill pot with Drags of Oyl and leave in the middle of the House to attract rats and mice then straw [strew?] about the place Pot ashes and it kills them all. Burn two live mice or rats in an earth pot over fire of Ashen Tree Wood, their cries will attract all others who you can kill. Spread weasel brains and Hog suit about cheese chamber to keep away mice. Paste of Helliberry leaves, wheat flour and honey put into their holes, they will eat it and die. Bitter almonds and wheat flour pastes will kill them. Seade of wild Cowcumbers, Colluentida and Oat flower paste will kill them. Pot ashes thrown into holes will kill them. Mix small iron or steel filings with wheat dough to kill them. Hemlock seed will kill them. (W.W. 1680, 4-9)

238. (Carr, Menard and Walsh 1991, 181)

239. (Hood 1991, 287)

240. For example, in domestic economy manuals and cookbooks - "To Kill Rats. 1. Mix filings of iron with leaven, put it into a place where there is as a number of them, and if they once taste it they will die. 2. Put the ashes of oak into their holes, and if they are touched or covered with the ashes they will grow mangy and die. 3. Strew arsenick powder on cheese or butter, and they will eat it and burst; but take care the cats and dogs do not come to it." (Fisher 1750, 98) "A Receipt to Kill RATS. a quart of oat-meal, four knots of nux vomica rasped, four drops of the oil of Rhodes, and one grain of musk, all kneaded together in a paste, and left at proper places." (Waller 1763, Vol. II, No. V, May, 227)

241. "Mr. Roberts sure method of destroying Rats or Mice, by which he acquired a good Fortune. Mix flour of malt with some butter, and add thereto a drop or two of oil of anniseeds; make it up into balls, and bait your trap therewith. If you have thousands by this means you may take them all. The round trap with several holes is best; and it should be set in such places the vermin most frequent. But if you would take them without a trap, make up small balls of the above-mentioned composition, and add to every four ounces a quarter of an ounce of corrosive sublimate." (Saunders 1750, 6)

242. March 5, 1764. Ralph was a stonecutter, presumably enslaved. (Greene 1965, 259)

243. April 25-26, 1777. (Greene 1965, 1100-1101)

244. "The Rats are very bad, they have just broken a setting of Eggs. Uncle Israel set a Trap and caught five very large Rats." T. Nelson Jr. to T.F. Nelson Sr. (Nelson c.1860). "Rats. Mix as a little powdered potash with meal and throw it into the rat-holes and it will not fail to drive the rats away. If as a mouse enters into any part of your dwelling, saturate a rag with cayenne in solution and stuff it into his hole. - Mrs. S.D." (Tyree 1879, 504)

245. (Smith 1768)

246. (Southall 1793)

247. Consider extensive entries in Every Young Woman's Companion for receipts to kill rats. For example, "Useful Receipts in a Family. To Kill Rats. Place pounded Quick-Lime, mixed with Oatmeal and coarse Sugar, in the Rats way, with some water near it; and when they eat it, they will drink till they burst, after which the rest will leave the House".

"The professed Rat-Catchers gather them together in great Numbers, and then destroy them. Their method is this, - They trail a Piece of the most strong scented favourite Food of the Rats, such as toasted cheese, or broiled Red-Herrings, from the Holes or Entrances to their severall Recesses in every Part of the House, or contiguous Buildings, whence it is proposed to allure them, to the Place of their Destruction, which should be some Closet or small Room, into which all the Openings, but one or two, should be shut. At the Extremities, and in different Parts, of the Course of these trailed Tracts, small Quantities of Meal, or any other kind of their Food, should be laid, to bring the greater Number to the Tracts, and to pursue their Course to the Centre Place where they are to be taken, where a more plentiful Repast should be prepared for them, and the trailing repeated for two or three Nights." (Johnson 1770, 177-178)

248. Consider the appearance of stories in the Virginia Gazette about incredible infestations in England. Virginia Gazette, Williamsburg, March 3, 1768 p.2 col. 2. Cited in (Purdie and Dixon 1768) Extract from a letter from Bridgewater England Dec. 16, [1767] "a most extraordinary phenomenon has lately appeared in the villages of Limpesham, Burnham, Brents and several other parishes near this place; the fields of which are overrun with an incredible number of mice, which do infinite damage; the dogs and cats have killed great numbers, but a so clogged [sic] that they will not now go after them. The cattle will not touch the grass where these vermin are, and we expect no relief but from severe frost, which it is hoped will destroy them. A similar circumstance is not to be remembered by the oldest person in these parts." Also, a tale of the barbarous archbishop Hotton of Germany who was devoured by rats at the Tower of Maus-thorn for his massacre of starving peasants of whom he said, "these vermin were a kind of rats, which were good for nothing but to consume the fruits of the earth, and consequently prejudicial to the public." (- 1809, 38)

249. (Dobson 1798, Vol. XII, 454-469)

250. Re: Animals of the Rat Kind, "These distinctions [physiological traits] might serve to guide us, had we not too near an acquaintance with this noxious race to be mistaken in their kind. Their numbers, their minuteness, their vicinity, their vast multiplication, all sufficiently contribute to press them upon our observation, and remind us of their existence. Indeed, if we look through the different ranks of animals, from the largest to the smallest, from the great elephant to the diminutive mouse, we shall find that we suffer greater injuries from the contemptible meanness of the one, than the formidable invasions of the other."... "with the little teazing race I am now describing: no force can be exerted against their unresisting timidity; no art can diminish their amazing propagation: millions may at once be destroyed, and yet the breach be repaired in the space of a very few weeks; and, in proportion as nature has denied them force, it has supplied the defect by

their fecundity."... "of these, [animals of the rat kind] the animal best known at presest [present?], and in every respect the most mischievous, is the great rat; which, though but a new comer to this country, has taken too secure a possession to be ever removed. This hateful and rapacious creature, though sometimes called the rat of Norway, is utterly unknown in all the northern countries, and, by the best accounts I can learn, comes originally from the Levant. Its first arrival, as a I am assured, was upon the coasts of Ireland, in those ships that traded in provisions to Gibraltar; and perhaps, we owe to a single pair of these animals the numerous progeny that now infests the whole extent of the British empire." (Goldsmith 1795, Chapter XI, Vol. II, 270-271)

251. "as a Recipe for killing Rats. In 1783 as a premium of five guineas was given by the Dublin Society for the following recipe to kill Rats. - Take 1 quart of oatmeal, 4 drops of oil of Rhodium, 1 grain of musk, 2 nuts of nux vomica powdered. Mix the whole together, and place it where the rats frequent; continue to do so while they eat it, and it will soon destroy them, be they ever so numerous." (- 1806, Vol. V, No. 9, 72)

Miller's Methods sent from Germany: lure rats to the lid of a cask covered with oatmeal for several days to create a false sense of security. One day replace the lid with a piece of parchment cut so as to yield under the weight of the rats. The first victim will fall into about 6 inches of water but seek refuge on top of a brick placed in the center of the barrel. It will begin to shriek. These cries will attract others who also fall in and then fight to the death with one another to perch on the dry brick. The huge battle and shrieks will attract rats from all over the neighborhood and many hundreds will be described in the fighting. This method is even easier if the melee gets started off with a live rat caught in a trap or purchased from a rat-catcher. "In this way those destructive vermin may be suddenly exterminated from a house or neighborhood at very little trouble or expense." [Domestic Encyclopedia] (Miller 1806, 43-44)

252. October 26, 1774 (Greene 1965, 888)

253. (Sheilds 1990, 152)

254. (Mouffet 1658, 932-933)

255. Watercolor of flies included in White's collection of animal illustrations. (Lorant 1946, 220)

256. White drew a firefly *(Pyro phorus nochilucus)* and described it as, "A flye which in the night semeth a flame of fyer." (Lorant 1946, 214). Benjamin Henry Latrobe makes note of the firefly's appearance, behavior and characteristics. (Carter 1977, 1930) June 12, 1781 - near Boston, MA, "The night caught me a mile or so from the town, and I was not a little surprised to see the two meadows on the sides of the road I was riding upon covered with sparks of fire extending from the surface of the ground to from five or six feet above. I at first ascribed it to the extreme heat of the last five days, But I hardly knew what to think, when all at once I saw some which seemed to come out of the road upon

which I was. I saw them even on the ground and all around me. I got down suddenly from my horse to pick up one of these sparks which seemed to me so extraordinary, and I could not have been more astonished by anything that I was at finding in my hand a sort of fly which threw out a great light; this insect is in this country called the *firefly*. They produce precisely the same effect as the shining and burning worms in France, except that they are innumerable." (Cromot 1880, 214)

257. White drew a *Tabanus sp.*, or gadfly which he described as "A dangerous byting flye." (Lorant 1946, 214) While William Byrd described horseflies as "not only a great grievance to horses but likewise to those that ride them. These little vixens confine themselves chiefly to the woods and are most in moist places. Though this insect be no bigger than an ordinary fly, it bites very smartly, darting its little proboscis into the skin the instant it lights upon it. These are offensive only in the hot months and in the daytime, when they are a great nuisance to travelers; insomuch that it is no wonder they were formerly used for one of the plagues of Egypt. But dittany, which is to be had in the woods all the while these insects remain in vigor, is a sure defense against them. For this purpose, if you stick a bunch of it on the headstall of your bridle, they will be sure to keep a respectful distance." (Wright 1966, 293)

258. Re: the fly, "The Light, like Truth, he doth exceedingly rejoyce in, and doth behave himself honestly therein and civilly." "I must no [sic] speake of his prowesse and valour. For in that he may seem to surpasse man himselfe." Although the ancients felt that, "All of them are begotten of filth and nastinesse, to which they most willingly cleave, and resort especially to such places which are so unclean and filthy; enquier are they, importunate, hateful, troublesome, tumultuous, bold, sawcy." (Mouffet 1658, 931-932)

259. (Mouffet 1658, 944-45)

260. "And if you have a chamber or passage where there is great resort of flies, take little springs of fern and tie them to threads like tassels, and hang them up and all the flies will settle on them at eventide; then take down the tassels and throw them out. Item, shut up your chamber closely in the evening, but let there be a little opening in the wall towards the east, and as soon as the dawn breaketh, all the flies will go forth through this opening, and let it be stopped up. Item, take a bowl of milk and a hare's gall and mix them with one with another and set two or three bowls thereof in places where the flies gather and all that taste thereof will die. Item, otherwise, have a linen rag tied to the bottom of a pot with an opening in the neck, and set that pot in the place where the flies gather and smear it with honey, or apples, or pears; when it is full of flies, set a trencher over the mouth and then shake it. Item, otherwise, take raw red onions and bray them and pour the juice into a bowl and set it where the flies gather and all that taste there of will die. Item, have whisks wherewith to slay them by hand,. Item, have little twigs covered with glue on a basin of water. Item, have your windows shut full tight with oiled or other cloth, or with parchment or something else, so tightly that no fly may enter, and let the flies that be within be slain with the whisk [translated as "paddle" in (Bayard 1991, 67)] or otherwise

as above, and no others will come in. Item, have a string hanging soaked in honey, and the flies will come and settle thereon and at eventide let them be taken in a bag. Finally meseemeth that flies will not stop in a room wherein there be no standing tables, forms, dressers or other things whereon they can settle and rest, for if they have naught be straight walls whereon to settle and cling, they will not settle, nor will they in a shady or damp place. Wherefore meseemeth that if the room be well watered and well closed and shut up, and if naught be left lying on the floor, no fly will settle there." (Power 1928, 174-176) Alternative translation in (Bayard 1991, 65-67).

261. (Mouffet 1658, 932)

262. 1942 poem (Nash 1975, 214)

263. Re: curious flies (- 1793, 672-675) Article lists a variety of agricultural pest flies.

264. In addition to carrying germs on their sticky feet, flies can transmit disease through their eating habits. They regurgitate stomach fluids to dissolve potential food sources, and then lap up the fluid. If the item they have landed on proves not to be food, this behavior can leave a spot behind, especially on glass, and mirrored or gilded surfaces (Whayne 1990, 38) An eventual awareness of the connection between flies and disease led to an all out war against flies in the early twentieth century in America. The movement was launched in the name of improved health. Food preparation and storage areas, eating places, and areas of human excrement needed to be protected from flies that fed and bred in these spaces and carried diseases. Killing flies, as well as preventing their access to homes, became a priority. (Curtin 1989, 114, 153) British authorities, unlike America authorities resisted using screening to protect kitchen and dining spaces from disease carrying flies because it was expensive and reduced ventilation, which they valued highly for maintaining good health. (Curtin 1989, 114) Experiences with colonial and military environments led to fly control developments that were implemented in homes. (Curtin 1989, 118)

265. "To Kill Flies" Steep white hellibore in sweet milk and mix with Or piment, sprinkle room. Beta Alum and Origanum, mix with milk and sprinkle. Take a deep earthen pot and lay in it beaten Coliander and all the flies in the house will gather together. Take an earthen platter or dish that is broad and shallow, fill the same with Goats blood half full, and set the platter under the bed and all the flies will come into it like a swarm of bees. (W.W. 1680, 38-39, 28)

266. Under "Cookerie and Huswifery: How to Keepe flyes from oile peeces. A line limed over and strayned about the crest of oil peeces or pictures, will catch the flyes, that woulde otherwise deface the Pictures. But this Italian conceite both for the rareness and use thereof doth please me above all other: viz. Pricke a Cowcumber full of barley cornes with the small spiring ends outward, make little holes in the Cowcumber first with a woodden [sic] or bone bodkin, and after put in the graine, these beeing [sic] thicke placed

will in time cover all the Cowcumber, so as no man can discerne what strange plant the same should be. Such Cowcumbers and to bee hung up in the middest of summer roomes to drawe all the flies unto them, which otherwise woulde flies upon the pictures or hangings." (Plat 1609, 81-82) Letter to Mrs. Hester Davis from Susanna Whatman, Sept. 17, 1799. "I hope Sally takes care of the mahogany balustrade, and is careful to take off all fresh spots on the steel round the fireplace: the flies are very apt to make spots in the summer." (Balston 1956, 41)

267. As Propertius said "That which forbids the nasty Fly his dish to lick, is Peacocks feathers fasten'd to a stick." (Mouffet 1658, 947)

268. The use of a fly-flap, also referred to as a fly-flop, fly-brush or whisk was a strategy used around the world to ward off flies. Residents of India made fly-flaps out of the tails of oxen, Germans used foxes tails, and in addition to using fly-flaps, elephants were protected from flies by people who covered them with silk or linen clothes. (Mouffet 1658, 947)

269. (Mouffet 1658, 946) and (Simpson and Weiner 1989, Vol. V, p.1119) One fourteenth-century french domestic economy manual describes a device translated as a "whisk" or a "paddle" that was used to kill individual flies by hand. In the seventeenth and eighteenth century such devices seemed to have been more often used to shoo flies away and prevent them from settling than actually crushing them. (Powers 1928, 175 and Bayard 1991, 67)

270.John W. Hamilton bought a fly-brush handle from Key (furniture Maker in 1857) for .75 cents. In Lexington Virginia (Key 1857-1860, 35)

271. (Mouffet 1658, 932) [See section on witches for more on this phenomenon.]

272. Col. Carter warned his son that he was mistaken if he thought that, "dogs all around him, in his bed chamber and before his door, till he chuses a more orderly room, to fill with flies and ticks, can denot [sic] a gentleman of Politeness." Aug. 11, 1777. (Greene 1965, 1124)

273. June 25, 1781. A plague of flies settled in Williamsburg during the British Cornwallis invasion. (Goodwin 1968, 79) In July, 1781, a letter from Frances (Bland) Randolph Tucker to Col. St. George Tucker written in Bizarre near Farmville, VA noted that she was writing by candlelight and that the bugs and flies were troublesome. (Tucker Coleman Papers, Swem Manuscripts and Rare Books, The College of William and Mary) A letter from St. George Tucker to his wife Frances Bland Randolph Turner from Williamsburg July 11, 1781 reported that, "Among the Plagues the British left us in Williamsburg, that of Flies' is inconceivable. It is impossible to eat, drink, sleep, write, sit still or even walk about in Peace on Account of their confounded stings. Their numbers exceed description, unless you look into the eighth chapter of Exodus for it..." (Tucker Coleman Papers,

Swem Manuscripts and Rare Books, The College of William and Mary). Copy in (Colonial Williamsburg Foundation, Tucker-Coleman Papers microfilm M-1021.3 May 3, 1779-July 31, 1782). Cited in (Goodwin 1968, 285)

274.(Morris 1981, 1343)

275. (Peters 1988, 266)

276. (Weber 1984, 3-7)

277. "And now I am upon the subject of insects, it may not be improper to mention some few remedies against those that are the most vexatious in this climate. There are two sorts without doors that are great nuisances: the tick and the horseflies. The ticks are either deer ticks or those that annoy the cattle. The first kind are long and take a very strong gripe [sic], being most in remote woods above the inhabitants. The other are round and more gently insinuate themselves into the flesh, being in all places where cattle are frequent, Both these sorts are apt to be troublesome during the warm season, but have such an aversion to pennyroyal that they will attack no part that is rubbed with the juice of that fragrant vegetable. And a strong decoction of this is likewise the most effectual remedy against seed ticks, which bury themselves in your legs when they are so small you can hardly discern them without a microscope." History of the Dividing Line p.157-338, cited in (Wright 1966, 292-293)

278. The tutor Philip Fithian recorded the condition of a tick-bitten child over the course of almost three weeks in August of 1774; Wed. Aug. 10 - "All in School - Miss Fanny very much troubled with the festered Bites of Seed Ticks-" Fri. Aug. 12 - "Fanny is confined to her chamber with a Fever occasioned, I am apt to believe, by the inflamed bites of the Seed-Ticks, which cover her like a distinct Small Pox." Sun. Aug. 14 - "Fanny is yet confined to her Chamber." Mon. Aug. 15 - "The People are better only Miss Fanny with the Sores continues in her Chamber.". Mon. Aug. 29 - "Miss Fanny in School to Day, but not entirely well of her Sores made by the Ticks-" (Farish 1945, 207-237)

279. For example, Benjamin Henry Latrobe (Carter 1977)

280. Topsel notes that wasps are repellent for the terrible noise they make, but admirable for demonstrating a civil government, and fatherly affections and instincts towards its house and young. They are nastier in warmer climates and they can be killed by luring them into a pot with meat in it and then pouring in hot water, or baiting it with a poison of corrosives like sublimate, vitriol, or auripigentene mixed with honey. He also included remedies for relieving the pains of their stings. (Topsel 1658, 651-655)

281. De Crèvecoeur had a hornet's nest suspended in his parlor with a hole in the window pane to allow hornets in and out. "By this kind usage they are become quite harmless; they live on flies, which are very troublesome to us throughout the summer; they are constantly busy in catching them, even on the eyelids of my children...By their assistance I am but

little troubled with flies. All my family are so accustomed to their strong buzzing that no one takes any notice of them; and though they are fierce and vindictive, yet kindness and hospitality has made them useful and harmless." (De Crèvecoeur 1986, 64) Re: a stay in Lansdown, Virginia December 1804 - "I dined there and amused myself with seeing some hornets feeding on flies. So eager were they for their prey that the old woman [innkeeper] had almost tamed them by sticking the flies on pins and holding them up when the hornet would plunge on the flies' heads and carry them off, eat them and come again for more." (Davis, 1954, 135)

282. (Carter 1977, 151, 176-178)

283. (Morris 1981, 233)

284. "Besides] very many [Spanish] lost divers parts of their body, feet and hands principally, by a little vermine lesse than a Flea, and skipping like it, called *Nigua*, which got between the skinne and the flesh before they were aware, and there bred and multiplyed, making swellings and putrefactions, to the decay and losse of their bodily members." (Kingsbury 1933, Vol. III, 560) "Generall Historie of Virginia by Captain John Smith, Fourth Book, 1624." Cited in (Tyler 1946, 367)

285. "The chego or *pulex minimus, cutem penitrans, americanus* of Catesby, is a very small animal found in warm climates. It is a very troublesome insect, especially to negroes, and such as are slovenly or go barefooted. These animals are a great nuisance to most parts of America between the tropics." (Dobson 1798, Vol. XV, 644)

286. (Morris 1981, 856)

287. A notable exception is a fourteenth-century manual on domestic economy in which moth remedies are listed after strategies to kill wolves. However, the advice offered is consistent with that included in the cleaning sections of similar guides. Women are advised to take care of their Furs and Presses, and to inspect and shake them out, and to have all ladies do the same to all sheets, blankets, dresses, coats, furs, etc. while inspecting for moth damage. Women are also advised to air out their textiles often to avoid larvae damage, to put them in the warm sun (both to kill larvae and to dry items), avoid storing when damp, air out and shake out to get rid of dust, and clean with a whisk of dry twigs. The author refers to moths as "suich vermin." (Bayard 1991, 99)

288. Letter to William Balston 14 Aug. 1799 "I shall beg Davis to have my Dressing room carpet shook out, and to see the moths do not get into it." (Balston 1956, 40) And, "Against Moths, Worms, &c. Dry the herb botris, strew it among your cloths, and neither moth nor worm comes near them."[In cleaning section under Useful Family Receipts] (Fisher 1750, 78) (Saunders 1750, 11) [Title page in Saunders claims "Never before Published"]

289. (Kalm 1972, 206)

290. "A mixture to keep moth [sic] out of furniture and to take grease spots from carpets or clothes." - "One quart bottle one third full of rain water; one ounce and a half of castile soap, shaved fine and put into the bottle of water. It must be shaken until all the soap is dissolved and forms a very thick smooth suds. Then fill up the remainder of the bottle with equal proportions of spirits of wine and spirits of turpentine. This will take out spots of grease and freshen and renew cloth after it is old and defaced" (Howard 1873, 373) And, Re: cleaning carpets... hang out 3-4 times a year to get rid of dirt and at least once a year to avoid moth trouble. Sprinkle tobacco or black pepper under carpet to prevent moths . (An Experienced Lady 1839, 130) And, "Preservatives against the ravages of Moths. Moths are very apt to eat woollen and fur garments early in the summer. To keep them from the garments, take them late in the spring, when not worn, and put them in a chest, with considerable camphor gum. Cedar chips, or tobacco leaves, are also good for this purpose. When moths get into garments, the best thing to destroy them is to hang the garments in a closet, and make a strong smoke of tobacco leaves under them. In order to do it, have a pan of live coals in the closet, and sprinkle on the tobacco leaves." (An Experienced Lady 1839, 132) And, under housecleaning: "The carpets should be rolled up smoothly, with tobacco sprinkled between the folds, sewn up in coarse linen cloths, and put away till autumn." "A closet chest is an excellent place to keep carpets as well as other woolens. If you have no cedar closet, however, a cedar chest will serve to protect your woollen clothes against the moths, & it is better to preserve them in this way than to sprinkle them with tobacco, which imparts an unpleasant scent to them." (Tyree 1879, 498)

291. (Morris 1981, 55)

292. (Peters 1988, 243)

293. To Kill Pismires [ants]. Burn roots of wild Cowcumber and smoke will kill them. Place earthen dish full of pismires on fire in area of pismires and others will not come back. Throw burned mussel shells mixed with storax on their holes and they will come out, and you can kill them. Powdered Origanum before their holes kills them. Circenicum melted in oil and poured over their holes will kill them. Anoint the bottom of plants with Lupin mixed with the dregs of oil to protect plants. Cover your sugar box with white wool or anoint it with Rubica. Mix brimstone melt and salt of Wine stone with water and sprinkle on holes to drive them away. (W.W. 1680, 16-19)

294. "Mr. [Benjamin] Franklin was much inclined to believe that these little insects could by some means communicate their thoughts or desires to each other, and he confirmed his opinion by some examples." (Kalm 1972, 157)

295. (Carter 1977, 189)

296. "Remedy for Red Ants. Kerosene oil is a sure remedy for red ants. Place small blocks under sugar barrel so as not to let the oil touch the barrel. Mrs. J.W." (Tyree 1879, 503)

297. "To Drive Away Ants. The little red ants will leave closets where sea sand is spindled, or where oyster shells are laid. Scatter sprigs of wormwood where black ants are troublesome." (Under "Misc.") (Howard 1873, 374)

298. (De Crèvecoeur 1986, 180-183) (Carter 1977, 243-244)

299. Topsel felt that serpents were permitted by God to eat the dust of the earth, and also eat men, women children, sheep, oxen, birds, etc. He claimed that they extract the moisture and expel the rest. He felt that snakes were "illiberal, perfidious, treacherous, venomous, poysonful, stinging, implacable, furious, savage, merciless, etc." Topsel suggested fumigations to drive snakes away that included roots of lilies, hartshorn, horns and hooves of cloven-footed beasts, and bayleaves and berries. He also suggested using fleabane by itself, not in fumigation, or the scrapings of cypress and cedar steeped in oil, to drive snakes away. He understood that fumigations worked by plugging up the snakes' pores and suffocating them. (Topsel 1658b, 591-618)

300. "The segmented snake, with each section labeled to represent the various colonies, and below the motto 'Join or Die'. This cartoon appeared on May 9, 1754 in the *Pennsylvania Gazette* and in the *Boston Magazine* twelve days later on May 21, 1954 bearing the words 'Unite and Conquer'." The Pennsylvania Gazette, Philadelphia. American Antiquarian Society the Collection of Isaiah Thomas May 9, 1754. Cited in (Barnhill 1991, 17)

301. A notable exception is the role the spider plays in the late eighteenth-century children's morality tale, "The Adventures of a Fly, as Told by Himself" in which the protagonist fly gets trapped in a spider's web and is threatened with death by both the spider, and a mean child. (Jones c.1794)

302. (Morris 1981, 1244)

303. ( Topsel 1685, 777) Re: wild spiders - "The baser sort of Spiders, and such as be least reputed of, are those that live in holes, Caves, and corners of Houses, and these in respect of the former are slow, slothful, and lazy, fatt, grosse, and big-bellyed corner creepers, and these spin a very homely, rough, and coarse thred, which they spread abroad, and set before the hollow places and chinks of walls." (Topsel 1685, 785)

304. (Topsel 1658b, 777) (Mouffet 1658, 1065-67)

305. (Topsel 1658b, 777) (Mouffet 1658, 1065-67)

306. (Topsel 1658b, 778)

307. (Mouffet 1658, 1066) (Topsel 1658b, 779)

308. Topsel cited an historic episode, with no date specified, that emphasized the foolishness of casting out spiders, "[poorly advised Princes and Governors] sent out their proclamations and warrants to expell the Spider, the cast her down to the earth, thread under foot, undoe and kill, as a night thief, with beesoms, brooms, brushes and long poles, so that by and by in a trice there flocked certain Furies of hell (for so I think I may justly call them) rubbing, brushing, spunging, making clean sluts-corners, berating and sweeping together, and whatsoever they found curiously wrought, all that either they swept clean away, or tore all to pieces, so that hardly they could escape the busie beesome of these quick-sighted and lewd packs." "Again, the great men, the rich misers and penny-fathers, following the example of their Princes and Governors, they in like set packing out of their doors, the Schoolmistresse of all labour, diligence and virtue, and will not permit a web, the very pattern, index, and anathema of supernaturall wisdome to remain untouched." (Topsel 1658, 779)

309. "But yet, it is more to consider what great justice and equity is observed to be in Spiders; For there is not one of them so ill bent, so malapertly sawcy, and impudently shamelesse, that can be seen to lay claim unto, or to take away another's wife or mate: there is none that intermedleth with another's substance, businesse, or weaving; everyone liveth contented by the sweat of his own browes, by their own proper goods and industrious pains-taking procured by their own bodily labour: so that not one of them dare enter his Neighbors freehold, but is accounted a hainous matter, and very unlawfull, not one dare be so knack-hardy as to break into their friends and fellowes fence and enclosure, but it is even detested as a wicked and cursed deed." (Topsel 1658, 782-83)

310. (Topsel 1688, 784) Also, "Spiders go into the lodgings, shops and Warehouses of poor men, to commend unto them contentment, patience, labour, tolerance, industry, poverty and frugality. They are also to be found in rich men's chambers, to admonish them of their duties." (Topsel 1688, 787 )

311. (Topsel 1658, 788-89) Medical practicioners often used animal and insect parts and products in treating the ill and wounded in seventeenth-century medicine, and the spider is not unique in this regard. Topsel included a section in his book that detailed the medical uses of each animal and their products (i.e. urine) at the end of each entry in his compendium on animals, and provided a full index for "Remedies for All Diseases Incident to the Body of Man, Drawn from the Several Creatures contained in this First Volume." (Topsel 1658, 819)

312. (Topsel 1658, 788)

313. Some authors were not hesitant to celebrate the fly-catching abilities of other insects, like wasps. For example, DeCrèvecoeur's had a wasp nests suspended in his parlor and a hole in the window pane for them to enter and exit the house; "By this kind usage they are become quiet harmless; they live on flies, which are very troublesome to us throughout the summer; they are constantly busy in catching them, even on the eyelids of my children."

"By their assistance, I am but little troubled with flies. All my family are so accustomed to their strong buzzing that no one takes any notice of them; and though they are fierce and vindictive, yet kindness and hospitality has made them useful and harmless." (DeCrèvecoeur 1986, 63-64) Also, a traveler at an inn in Lansdown, Virginia. Dec, 1804 noted, "I dined there and amused myself with seeing some hornets feeding on flies. So eager were they for their prey that the old woman [innkeeper] had almost tamed them by sticking the flies on pins and holding them up when the hornet would plunge on the flies' heads and carry them off, eat them and come back for more." (Davis 1954, 134-135)

314. Woodcut illustration. (Jones 1794, 44) [Figure]

315. "A Little Lady in Great Fright." "Well! This is a picture that may/ Provoke any body to laughter,/ Here's a *lady* a running away,/ And a *spider* scampering after!// The spider express'd his surprise,/ With contempt upon every feature,/ That a thing of his mimikin size,/ Could fright so gigantic a creature!// 'I can do her no harm if I try,'/ Said he 'with my pincers so pliant,'/ 'For the fangs that would *murder* a fly,'/ 'Would only *tickle* a giant.'// 'What need can there be for her fear?'/ 'For were I about her to linger,'/ 'I think it would take me a year'/ 'To bite off the end of her finger!// 'Or if a great web I should weave,'/ 'Expecting that way to come at her,'/ 'She could blow it away I believe,'/ 'And there'd be an end of the matter.'// 'True spider,--- and yet I have heard,'/ '(Though a baby might crush you to pieces)'/ 'Some people there are so absurd,' / 'As to fear you and all of your species.'// With this he ran off to his nest,/ (A cobweb commodious and shady)/ But told every neighbor he met,/ That a *spider* can frighten a *lady.*" (Gilbert 1814, 5-6 and facing page 6) [Figure]

316. "Illiteracy was widespread in Virginia, as it was everywhere in this century [seventeenth]." (Blanton 1930, 88) Medical folklore flourished, encouraged by the agrarian culture of Virginia in which estates were widely distributed across the landscape and medical services were expensive. Recipes and remedies were passed around and copied into diaries and letter books. (Blanton 1931, 215) The same is very likely true for pest control receipts.

317. For example, (Americanus 1775, 361) method for preventing the increase of bugs in newspaper, or (- 1803, 143) re: flea, a recipe for preventing the flea from infesting persons, beds, or rooms advised use of pennyroyal.

318. For example, re: featherbeds. "...you put in these Bags [in the oven after baking bread] to dry the Feathers thoroughly, as also to destroy anything quick, amongst such Feathers." Also, "but by the care and good Management of them [feathers], in drying them in the Oven, and thereby not only seasoning but destroying such Vermin as feathered Fowls are subject to,..." (Cook 1936, 41-42)

319. The wealth of kings allowed them to afford staff specifically designated for particular cleaning and pest related tasks.[(Anon, 1790) Also, in some resort locations in the south

like White Sulphur Springs, Virginia, it was not unusual for young black boys to be responsible for fanning flies away from dining guests. (Mackie 1864, 65) In this case the servants and slaves were also children. Re: children.. "Child slaves who lived at the rural plantations and were aged seven to ten helped in the fields, and may, like other youngsters (Indian, free African or English), have helped scare blackbirds and other pests from the ripening corn." (Yentsch 1994, 173)

320. (Blanton 1930, 91-92)

321. 1751 newspaper ad for goods sold by George Gilmer includes rats-bane, and birdlime to be sold in a Williamsburg, Virginia store. September 19, 1751 William and Mary Quarterly Vol. 12 p.161. Cited in (Blanton 1931, 331) Ad in The Virginia Centinal and The Winchester Mercury Virginia appears on June 4, 1788 pages 3, 4, "Said Clark [Thomas Clark[e] has for sale an INGREDIENT for destroying BUGS and FLEAS."

322. Black hellebore, or Veratum Vinex, was an ingredient in many pesticides [and medicines]. May 27, 1790 (Moseman 1763-1820, Vol. III, 222) Hellebore Nigr was prescribed as one ingredient in treatments including insecticides for roaches. It grew wild in marshy areas and was gathered by locals who either kept it themselves, or sold at market (Miller 1806, 144) (Blanton 1930, 115)

323. (Trovillion 1946)

324. (Heflin 1990, vi)

325. (Heflin 1990, 59, 64) An exception to this practice was reported by William Byrd on the occasion of the death of a slave, "Poor old Jane died this morning about 9 o'clock and I caused her to be buried as soon as possible because she stank very much." Secret Diary of William Byrd of Westover. p.461. Cited in (Heflin 1990, 64)

326.(Heflin 1990, 64) Embalming was practiced among the wealthy and elite in England in the late Middle Ages and early modern period. The practice was encouraged by a growing social anxiety about death, an unease about physical decomposition, and a desire to preserve the corpse until an elaborate burial ceremony was arranged. It later became a simple matter of social prestige. (Gittings 1984, 29, 64) An example of the process can be drawn from the death of King Henry VIII in 1547 when, "apothecaries, surgeons and wax chandlers were summoned 'to do their duties in spurging, cleansing, bowelling, searing, embalming, furnishing and dressing with spices the said corpse,' the plumber and carpenter cased the corpse in lead and placed it in a coffin..." (Gittings 1984, 216) For more on this practice, see 1705 Thomas Greenhill's The Art of Embalming.

327. (Heflin 1990, 39) For an example of some British burial customs, including tossing rosemary, see the sixth print in the Hogarth series of engravings entitled "A Harlot's Progress" reproduced in Sean Shesgreen. Engravings by Hogarth, New York, Dover Publications 1973, Plate 23.

328. For example, one burial parlor was established in Norfolk, by 1808, and the Bucktrout Funeral Home in Williamsburg Virginia was established in 1756.

329. (Heflin 1990, 133)

330. Tate has no detailed discussion of funerals, burial, treatment of the corpse, etc. (Tate 1956) Heflin addresses attitudes toward death, with some discussion of the funeral ritual, but very little discussion of preparing the body. (Heflin 1990) Gittings does give details about embalming but apparently specific to England. (Gittings 1984)

331. (Gorn 1989, 296) Cited in (Numbers and Savitt 1989)

332. (Gorn 1989, 298) Cited in (Numbers and Savitt 1989)

333. (Gorn 1989, 302) Cited in (Numbers and Savitt 1989)

334. (Gorn 1989, 317-318) Cited in (Numbers and Savitt 1989)

335. (Reinhard et. al. 1986)

## NOTES FOR CHAPTER THREE, PAGES 102-169

1. (Smith 1768: vii)

2. (Berenbaum 1995, 284) One spell in the Book of the Dead (1750-1304 B.C.) was said to have first been used by the ram-headed god Khnum (the shaper of the sun, humankind, and the other Egyptian gods), translated as, "Be far from me, O vile cockroaches, for I am the God Khnum." Some feel these words may also have been used by priests in burial rites, who also fumigated areas with incense smoke, killing all insects, before they began their work in an area. (Gordon 1996, 149)

3. July 6, 1661, "My Uncles corps in a coffin, standing upon joynt-stooles in the chimney in the hall; but it began to smell, and so I caused it to be set forth in the yard all night and wached [sic] by two men." (Pepys 1970-1983, Vol. II, 133)

4. One remedy to preserve some food plants from insects and game advised, acquire 2 ounces per acre to be treated of assa foetida "such as is sold by the apothecary or druggist" (Waller 1763, Vol. II, No. V, May, 232) (Burnby 1983, 3-20) (Yentsch 1994, 162-163)

5. Margaret Hill Morris (1737-1816), lived and worked in Burlington, New Jersey. She operated a small pharmacy and included among her receipt book of remedies one "to destroy bugs," and one "to kill rats." (Evans 1975, 106) The significance of this remedy among a pharmacist's papers is especially important given that the pharmacist was a woman.

6. (Barton 1662-1676) (Mosman 1763-1820) (Burnby 1983, 3-20) (Steele 1977) (Blanton 1930, 115) (Blanton 1931, 31)

7. (Yentsch 1994, 162-163)

8. In circa 1680 James Love, a ship's surgeon, left a "large sedar chest full of books" in his will. Rappahannock County Records, V. 7, p.90. Cited in (Blanton 1930, 91)

9. July of 1857 Key made 1 fly brush handle for John W. Hamilton for .75 cents. (Key 1857-1860, 35)

10. One such wallpaper hanger, for example, was Benjamin Tiffin. He wrote a treatise on the subject; Tiffin, Benjamin. Buggs effectually destroyed, in town or country by Benjamin Tiffin, bug-destroyer to His Majesty, and paper-hanger, son and successor to Mrs. Tiffin. London, 1755.

11. (Berenbaum 1995, 114)

12. (Blanton 1930, 132)

13. (Snetsinger 1986, 32)

14. "Legerdemain is an Operation, whereby one may seem to work wonderful, impossible, and incredible Things by Agility, Nimbleness and Slightness of Hand. The Parts of this Art are principally two. The first is the Convegance [sic] of Balls, Cards, Dice, Money, &c. The second is in Confederacy." (Old Hocus Pocus 1742, 3)

15. (Snetsinger 1986, 32)

16. (Snetsinger 1986, 32)

17. (Snetsinger 1986, 32)

18. "Few persons are aware of the injury they sustain, by eating the flesh of diseased animals. None but the Jewish butchers, who are paid exclusively for it, attend to this important circumstance." (Randolph 1824, 17) Also consider, Snetsinger, Robert. "Was the Pied Piper of Hemelin Jewish?" Midstream. 1986, 32(8): 32-34.

19. (Hocus Pocus 1708) (Old Hocus Pocus 1742) Both of these texts were bound with editions of The Compleat Vermin-Killer

20. The 1688 edition of A Necessary Family-Book included section labeled, "To which are added, Many Natural and Artificial Conclusions, both Pleasant and Profitable." This section includes a diverse listing of items ranging from additional pest control remedies, to recipes for invisible ink, strategies to preserve fruit year round, magic tricks like making a glass of water seem to boil, making coins seem to fall through a table, making water freeze by the fireside, and how to make a "cat Piss out a fire." (R.W. Gent. 1688)

21. Evidence for the presence of ratcatcher appeared in a variety of sources. For example, one letter printed in a newspaper regarding a German method to control rats advised buying a rat from a ratcatcher and using it to draw the annoying rats to a specific area for extermination. (Miller 1806, 44)

22. (Busvine 1977) (Snetsinger 1986, 32)

23. Some of the early firms in England include H. Tiffen and Son 1695, Dalton and Sons 1710, and William Howard and Sons 1750. (Snetsinger 1986, 33)

24. (Snetsinger 1986, 33) The prevalence of Jewish practitioners in the field of extermination has persisted in America, starting in the late nineteenth century with the demand precipitated by increased urbanization, Jewish exterminators, especially German Jews, moved into America and set up businesses. In his history of the extermination industry Snetsinger found that, "Until World War II more than 50% of exterminating companies were Jewish founded and owned." (Snetsinger 1986, 33)

25. (Gill 1989) (Waller 1763) (A Lady of Respectability 1752) (Tobler 1781) (Milligan 1790) (Thompson and Waller 1796) (Mullin 1799) (The Author 1799) (The Editor 1800) (Simmons 1801) (Nelson 1801) (Charless 1805) (Richards 1806) (Fry 1810) (Worsley and Smith 1818) (Maddox 1819) (Ellyson 1845) (Ellyson 1845-46) (Montague 1850-51) (Elliot and Nye 1852) (Coffield 1860)

26. (Snetsinger 1986, 33)

27. (Berenbaum 1995, 315-322)

28. (Yentsch 1994, 220-222, 241) (Kelso 1984, 217-221)

29. (Hole 1953, 77)

30. (Hickin 1974, 7)

31. One housewife resented the application of DDT to her home to kill malarial mosquitoes, because she now had to spent a greater amount of time sweeping up flies also affected by the chemical. (Wigglesworth 1976, 25)

32. (Berenbaum 1995, 286)

33. (Berenbaum 1995, 285) (R.W. Gent. 1688) (W.W. 1680)

34. Advancements in scientific understanding were demonstrated by the work of Francis Bacon and the development of the scientific method, Ulysses Aldrovandi's classification of insects, and Thomas Mouffet's "Theatre of Insects." (Berenbaum 1995, 286)

35. Contemporary scientists divide pest control practices into several, more specific categories. These pest suppression methods include: Biological schemes dependent upon natural enemies of the pests or resistant host varieties that can withstand pests; Chemical schemes like insecticides, insect growth regulators, attractants, repellents, and chemosterilants; Autocidal schemes like sterile insect release methods or genetic manipulation; Physio-mechanical methods like, exclusion, energy (using light, sound, heat, cold, or moisture to regulate pest activity), collection methods like trapping or suction, destruction methods like crushing or grinding; Cultural methods like crop rotation, sanitation, crop residue destruction, the timing of planting and harvest, maintenance of crop vigor by way of fertilizing or pruning, soil and water manipulation like tillage or irrigation; and Regulatory schemes like quarantines for exclusion and restriction, suppressions and eradication. (Peters 1988, 316)

36. (Wigglesworth 1976, 11)

37. "Whereas it has pleased Almighty God for the Punishment of our Sins to visit this Country [Virginia] with a great and visible Plague of Caterpillars which threaten the

destruction not only of the fruit & Mast but also of Corn and other grain, & consequently a great dearth & famine if God of His infinite mercy do not remedy and prevent the same...I Francis Nicholson Esqr....with advice and consent of his Ma[jest]ys hon[ora]ble Council of State of Virginia have thought fitt to appoint a solemn day of fasting and for deprecating the wrath of Almighty God..." Executive Journals of the Council of Colonial Virginia, Vol. 2, p.4. Cited in (Blanton 1931, 51) Also, regarding this same episode of infestation, "At a meeting of the Council on April 25, 1700 it was resolved that 'whereas it has pleased almighty God of his infinite mercy to deliver this Colony from ye late great & rageing Plague of Caterpillars wth wch it was Infested in an humble sence therof, it is ordered...yt ye 5th day of June next be observed and kept...as a day of thanksgiving...and yt a Proclamation be drawn,'" Executive Journals of the Council of Colonial Virginia, Vol. 2, p. 139. Cited in (Blanton 1931, 51). Also, in 1875 the Missouri Governor called for a day of prayer and fasting in the face of a locust plague. (Berenbaum 1995, 16)

38. (Bateman 1971, 11)

39. (Drummond 1994, 2)

40. (Hope 1996, 90) "The mousetrap is far and away the most invented machine in all of American history. Since it first opened for business in 1838, the U.S. Patent Office reports that it has granted more than forty-four hundred mousetrap patents, 95 percent of them to amateur inventors." (Hope 1996, 92) For more on nineteenth- and twentieth-century mousetraps in America see (Hope 1996)

41. Pinpointing a date for the initial invention in the western European world of a mechanical device to trap rats and mice is very difficult. Homer alludes to a mousetrap of some sort in "The Cambrians and the Mice." "Homer...ascribes this stupendous Machine to a Modern Artificier, which derives its Original from a far more Ancient Artist, and from the Ingenuity of the Welshmen." Some claim that this attribution was intended by Homer to serve as a Panegyrie on the Antiquity of the Cambrians and their Skill in Mechanic Arts. (Holdsworth 1728, 43)

42. (Roth 1956, 249-251)

43. This triptych is now in the Metropolitan Museum of Art, Cloisters Collection, New York (Bateman 1971, 46-47) (Roth 1956, 251)

44. (Bateman 1971, 43) (Roth 1956, 250)

45. (Bateman 1971) (Roth 1956)

46. (Bateman 1971, 44-45) (Roth 1956, 251)

47. (Tusser 1580, 173)

48. (Brothwell 1981)

49. For example, a 1662 inventory from the Cole Plantation in Maryland includes "½ pound of arsenek [sic] or Ratts bane..." (Carr et al. 1991, 181) While the "York County Virginia Orders, Wills and Deeds" #16, 1720-1729, included an entry for a rat trap of James Backhurst's, p.493. Also, numerous estate inventories from York County, Virginia listed traps. (Linebaugh, 1994) York County Inventories for 1649-1729 also list "a set of musketo curtains" in 1718 for James Burwell, and "1 sett old Gauzes Curtaines" in 1773 for Thomas Hornsby. Furthermore, merchants records listed items like traps and "rat wire." (Mason 1937) In 1772 a London merchant shipped 14 3'7" x 2'7" iron wire screens for Robert Beverley's cellar windows. Special thanks to Carl Landsburg of the Colonial Williamsburg Foundation Research Department for this reference derived from an original manuscript in the Library of Congress. (Carl Landsburg, Personal Communication 1993) Fragments of rat wire have been recovered archaeologically in the Colonial Williamsburg area. Special thanks to William Pittman of the Colonial Williamsburg Foundation Department of Archaeological Research and Documentation for this information. (William Pittman, Personal Communication, June 10, 1997)

50. (Drummond 1994, 2)

51. (Drummond 1994, 2)

52. One example of this sort of device was Leonard Mascall's sixteenth century "Mill to take Mice" that consisted of four wooden paddles that spun around a small central pole. The paddles were baited and placed to stick out horizontally off the edge of a table. Hungry mice jumped from the table to the device and revolved off into a waiting bucket of water below. (Drummond 1994, 2)

53. Special thanks to Marley R. Brown III, Director Archaeology Department, The Colonial Williamsburg Foundation for passing me this information. (Marley Brown III, Personal Communication, June 12, 2001)

54. In Jamaica, the capture and sale of rats was a significant source of income for many slaves. Rats infested and seriously damaged sugar-cane fields, and slaves were paid to capture them. In addition to the cash or goods offered in exchange for some proof of having trapped rats, usually their tails, the rest of the rat's body was also a marketable commodity since some slaves ate rat meat. (McDonald 1993, 46-47) "However, they were also a significant threat to the provisions slaves kept in their own homes, and slaves took steps to prevent goods from being destroyed or contaminated by rats. The slaves stored food and water in their houses in gourds and earthenware jars, some of which were suspended from the ceiling to prevent rats from getting grain or fish. As an additional precaution against pests, they built a device from a 'half cylinder of bark with the round side uppermost, the rope to which their food [was] appended passing thro' this up to the ridge pole.'" This, ideally, blocked the passage of rats down the rope to food suspended

above their reach from the ground. "Characteristic Traits," Columbian Magazine III 1797 p. 251-252. Cited in (McDonald 1993, 109) Some Europeans used a similar device to protect their food, "From the kitchen rafters there hung large hams in canvas bag and also the bread car, a kind of wooden crate in which bread was suspended away from the ravages of mice and rats." (Bayne-Powell 1956, 61)

55. (Drummond 1994, 2)

56. (Drummond 1994, 3) (Hornell 1940) (Yarwood 1981, 113)

57. Pepys reported on December 31, 1660 that, "my boy taking a catt home with him from my Lord's, which Sarah hath given him for my wife, we being much troubled with mice." (Pepys 1970-1983, Vol. I, 325) Although, this cat proved to be a pest in its own right by frightening the family and keeping them awake at night. Pepys wrote that on August 22, 1662, " the catt was locked in the chamber and keeped a great mewing, and leapt upon the bed, which made me I could not sleep a great while." (Pepys 1970-1983, Vol. III,. 173), He also wrote that on November 29, 1667, "our young gibb-cat did leap down our stairs from top to bottom at two leaps and frighted us, that we could not tell whether it was the cat or a spirit, and do sometimes think this morning that the house might be haunted." (Pepys 1970-1983, Vol. VIII, 553)

58. January 19, 1661 "From hence by Linke, and bought two mousetrapps of Tho Pepys the Turner; and so went and drank a cup of ale with him;" (Pepys 1970-1983, Vol. II, 19)

59. Advertisements in the Virginia Gazette indicate that "vermin" as well as "mouse" traps, generally imported from England, were available for sale. (Virginia Gazette, April 11, 1766 p. 4 Purdie edition) (Virginia Gazette, Sept. 19, 1766 p.3 Purdie edition) (Virginia Gazette, July 25, 1766 p. 2 Purdie and Dixon edition) (Virginia Gazette, Oct. 11, 1751 p. 4 Hunter edition) (Virginia Gazette, Sept. 28, 1769 p. 3 Purdie and Dixon edition) (Virginia Gazette, Dec. 12, 1771 p. 3 Purdie and Dixon edition) In this era, "vermin" generally designated larger mammal pests like weasels, badgers, polecats, or foxes. Vermin traps were probably not intended for mice, but could probably have taken rats, and may well have been used to regulate rat populations.

60. (Hope 1996, 92)

61. (Hope 1996, 92) George Suttier, a gunsmith and interpreter at the gunsmith shop in Colonial Williamsburg, displays a very small iron spring leg trap that would have been better suited to larger vermin, but could have trapped rats or even mice. (Colonial Williamsburg Foundation, Gunsmith Shop, August, 1997) A fragment of a very similar trap was recovered archaeologically from the nearby seventeenth-century site of Wolstonholme town. (Noel Hume 1997) Noel Hume feels that the spring from the snap trap he found at Wolstonholme town came from a small trap for rats. In his own research on the subject of mouse and rats traps, he found no documentary references for deadfall

traps in seventeenth-century Virginia. However, they were easy to make for even inexperienced carpenters, and surviving examples that used many different kinds of nails in one piece suggest they were not mass produced.. Alternatively, metal traps were commercially manufactured, and Noel Hume feels that the traps advertised for sale in the colonial era Virginia newspapers were these commercially produced metal type instead of the home-made wooden deadfall type. Special thanks to Ivor Noel Hume, former Director of Archaeological Research and Documentation with the Colonial Williamsburg Foundation, for this information. (Ivor Noel Hume, Personal Communication, June 10, 1997) One private trap collector, and active member of the North American Trap Collector's Association, has five traps made from a block of wood and what he identified as colonial era gun parts. They are all "guillotine" type traps designed to trap the victim's head, although generally not with enough force to sever it. (Robert Kwalwasser, Personal Communication August 11, 1997) For an example of a very similar type trap see (Bateman 1971, 104)

62. (Bateman 1971, 50)

63. Noose traps strangled mice who tripped a spring loaded wire that trapped their heads in the baited openings. A tradition of noose traps persists from at least the sixteenth century through the nineteenth and twentieth. Examples include The "Girl with Mousetrap" painting by Pieter van de Werff (1665-1722) in the Gemälde Galerie, Dresden. (A four hole, noose mousetrap held by a girl leaning out a window) and an example in the Colonial Williamsburg Collection, believed to be a nineteenth-century model.

64.(A Booke of Engines 1590) (Bateman 1971, 14-17)

65. (Noel Hume 1997, 296) Special thanks to Ivor Noel Hume, former Director of Archaeological Research and Documentation with the Colonial Williamsburg Foundation, for this information. (Ivor Noel Hume, Personal Communication, June 10, 1997)

66. Generally, these traps resemble ceramic mugs with a handle on one side and a flat surface, used as the base, on the other. When tripped, a small ceramic plate slides into a slot at the neck of the vessel from above, and blocks the entrance. The handle often doubles as a track to guide a string, connected to the plate at one end, and the bait on the other. When the bait is moved, or the greased string gnawed through, it releases the plate and traps the mouse. Surviving examples of these traps are often pierced with holes and slots. Some feel the perforations are merely decorative, others claim they allow trappers to examine the contents of the trap, allow for a knife to pass through and dispatch the occupant, or for water to easily flood and drain from the vessel to drown the victim. (Mérite 1942, 68-69) (Bateman 1971, 190, 217-218)

67. Rodents were attracted to bait placed in the far narrow, end of long fiber cones. The weave of these cones expanded to allow them forward passage, but contracted when they

tried to back out. These devices avoided the risks of poisoning, or other dangers associated with pesticides and many mechanical traps.(Mérite 1942, 101, plate IV) Similar traps were used for trapping small birds and fish by Africans, Native Americans and Europeans.

68. (Bateman 1971, 40)

69. See Chapter Two endnote 65 for more on bounties.

70. (Bateman 1971, 246)

71. Ad for rat poisons, "The Public are respectfully informed that Mr DAWSON'S famous POWDERS for Destroying RATS, MICE, and other VERMIN, may now be had, wholesale and retail, in packets price 1s. 6d. Each, or six parcels for 8s. Of Messrs. Goadby and Co. Sherborne, and their NEWS-MEN. These Powders are composed of certain valuable ingredients, entirely vegetable, and contain such a fascinating powder, that the animal, having once tasted them, is certain to return, and attract all others in the house, barn, or stable, by his smell, &c. - There are two parcels in each packet, one to allure, the other to destroy. *** No dog or cat will touch these Powders. Rats have been often found lying dead by the Powders." (Moore 1783, 127, 358)

72. (Carr, Menard and Walsh 1991, 181) (Bayard 1991, 97-98) (Waller 1763, Vol. II, No. V, May, 227)

73. Some fumigants also had medical applications, either by being inhaled by the patient or by allowing the afflicted area to be exposed to the fumes.

74."Take the Coals and Ashes of Rosemary, beat small, and sifted finely, four ounces, Labdanum two ounces, Storax and Benjamine, of each an ounce; Roots of Cyprus, Aromatick, red Mastick, and Amber, of each two drams, Cloves one dram, Musk, Civet, and Ambergrease ten grains, the Mucilage of Gum - Tragacanth, extracted with Orange-flower-water, as much as will make them up, and suffer them to dry as the former. These give an excellent Odour, and are very wholsom [sic] to the Brain, and drive away offensive Vermin and Insects, being burnt on coals." (J.H. 1695, TR)

75. "Loose-strife, or Willow-herb. The Smoak hereof being burned driveth away Flies and Gnats, which use in the Night-time to molest People inhabiting near Marshes, and in the Fenny Countries." (Culpeper 16??, 195)

76. "Fern being burned, the Smoak thereof driveth away Serpents, Gnats, and other noisome Creatures, which in fenny Countries do, in the Night-time trouble and molest People lying in the Beds with their Faces uncovered; it causeth Barrenness." "They are dangerous for Women with Child to meddle with by Reason they cause Abortions." (Culpeper 16??, 129)

77. Regarding the risk of fumigants to destroy body pests, "Feare candle in hailoft, in barne, and in shed,/ feare flea smocke and mend breeche, for burning their bed." (Tusser 1580, 179)

78. (Garrett 1990, 116, 118)

79. (Garrett 1990, 118) The author does not discuss the fact that improvements in heating, insulation, personal and household hygiene, light sources, fashion, and pest control all also impacted the decline of bed hangings and the dangers with which they were associated.

80. A 1684 Henrico County inventory includes "two peices [sic] of Mosquito Cloath." (Blanton 1930, 53)

81. Gauze or cheesecloth both protected food from insects pests. See *A Covered Painting; or Fruit Piece* by Raphaelle Peale c. 1818 oil on wood, for evidence of this practice. In this painting, cut and whole fruit is draped with a strip of loosely woven fabric to shield it from hungry wasps. Reproduced in (Garrett 1990, 203) By the mid nineteen century, Americans could purchase "wire dish covers," which were mesh domes with a handle on top, to protect food from pests, dust, etc. in the pantry or on the table. (An American Lady 1864, 8)

82. For a nineteenth-century example of this practice see Thomas Charles Farrer's 1859 *Woman Seated at Piano - Looking into Mirror*, drawing in pencil highlighted with tempera. The mirror is partially draped in gauze to protect it from fly specks. Tissue paper served the same purpose. The gauze would have been fastened with tiny pins. Reproduced in (Garrett 1990, 212)

83. Straw matting was a popular floor covering from 1750 through 1870, especially in the summer. Some felt that the deep weave harbored vermin, and that the pale color showed flyspecks and other dirt too readily. (Garrett 1990, 35)

84. Reportedly, when a mixture of skimmed milk and cold water was rubbed onto varnished surfaces, it effectively removed flyspecks. (Adamson 1963, 66)

85. By some estimates it took about twenty yards of mosquito netting or pavilion gauze to cover a bed, or less for a crib. (Garrett 1990, 200)

86. William Hugh Grove mentioned some "Wire and Gauze blinds which keep out the flies but admit the air" when traveling in Virginia in 1732, and Thomas Jefferson used wire screens at Monticello and the White House. (Garrett 1990, 202) "Green muskito netting for Bed Curtains or Windows for Blinds" was advertised in Annapolis in 1759. (Garrett 1990, 201) Wealthy residents of Charles Town South Carolina used "Pavilions Made of Catgut Gause" by 1725 to avoid mosquitoes. A letter of Margaret Kennett to Mrs. Thomas Brett, January 20, 1725 in Brian J. Enright (ed.) "An Account of Charles Town in 1725," South Carolina Historical Magazine LXI, Jan. 1960, p.170). Cited in (Merrens and

Terry 1984, 540) An order of January 15, 1770 from John Robinson of York County, Virginia to the London Merchant John Norton included "1 ps of suff that will wash & be proper to make 2 suits of Musketo Curtains." and order included the postscript, ""If not too much trouble shall be glad you will see to the buying the fish hooks, and stuff for Musketo Curtains as you know what is propr." (Mason 1937, 121, 119). Re: 18th century description of Virginian houses "The beds had hangings and mosquito nets,..." (Barton 1909, 52). June 26, 1776 inventory of his Excellency, Robert Eden Esq. of Annapolis included "Fly Netts made of White Twine fringed" in the Coachman's Bed Room [these were probably to protect horses and not people]; 2 pair Venetian blinds in the closet of Robert Eden's Bed Room; 2 sets of Venetian Blinds in the Passage adjoining his bed room; and 2 sets of Venetian blinds in the Gilt Leather Parlor. (Hood 1991, 296-400). December 29, 1773 inventory of his Excellency Governor Tryon's house in Fort George New York included 5 tent bed "Musketto hangings" in the Housekeepers bed chamber (Hood 1991, 304) Inventory of his Excellency William Campbell of Charleston, South Carolina included 1 green pavilion in Capt. Innes's Chamber; 1 child's cot with a pavilion, and one green pavilion in the nursery; 1 pavilion in the servants' bed chamber; and 4 window blinds in the loft (Hood 1991, 310-311) Inventory of Francis Fauquier, Esq. 1771-1783 included 1 piece of gauze. (Hood 1991, 296). Inventory of his Excellency Lord Botetourt October 24, 1770 included 2 Venetian blinds in the front parlor; 1 Venetian blind in the closet; 3 Venetian blinds in the dining room; 3 glass lustres with six branches each and gauze covers and 2 Venetian blinds in the Ball room; 1 blue Venetian blind in the Library; 2 yards worstead gauze in the 1st room; 2 Venetian suits of gauze curtains in a closet, and 100 feet fly lattice in the 3rd store room. (Hood 1991, 287-291) George Wythe of Williamsburg, Virginia ordered from the London Merchant John Norton "1o pieces flywire 3 feet 1 inch square" (Mason 1937, 169)

87. (Garrett 1990, 200-209) (Stilgoe 1988, 310, footnote 36)

88. Arsenic ingredients in dyes and pigments like copper arsenite and copper aceto arsenite are toxic. The danger of these ingredients in dyes eventually led to their ban for use in paints, wallpapers and other household furnishings. (Lynn 1980, 318-319) In fact, copper aceto arsenite was used in the nineteenth century and later as an insecticide and referred to as "Paris Green." (Mallis 1982, 910)

89. (Kimball 1941, 15)

90. (Garrett 1990, 138) Scalding and cleaning the bedstead with turpentine would have helped kill existing bugs, sealing all cracks and crevices with any varnish or paint would have deprived the bugs of living and breeding areas, but painting it with green paint would have had the additional bonus of poisoning bugs with the residue of Paris Green used to color the paint. It would also have put occupants of the bed at risk of poisoning, although that was probably not apparent to the woman in question who was working in a nursery, presumably on her child's bed.

91. Green blinds faded, developed water spots and showed dust. (Garrett 1990, 71)

92. (Mallis 1982, 910)

93. Elizabeth Wirt reported in an 1818 letter to her husband that she had torn wallpaper off the wall, rubbed wall cracks with turpentine and sent the bedstead out to be painted green in response to a bedbug infestation. "If after this I do not get the mastery of mine enemy I shall give up." she reported. (Garrett 1990, 138)

94. (Garrett 1990, 97, 106) Inventory of Lord Botetourt October 24, 1770 included 1 small wire cage and 4 wooden cages in the Powder Room, 100 feet Bird Cage lattice in a store room, 4 wooden bird cages in passage up stairs 1 wire bird cage with balance weight in pantry, and 2 old wire bird cages in a room over the study. (Hood 1991, 287-291) Inventory of Francis Fauquier 1771-1783 included 1 bird case (Hood 1991, 290)

95. (Garrett 1990, 97)

96. See the painting *The Sargent Family*, Charleston, Massachusetts 1800. Artist unknown. Caged birds are mounted on either side of the window. Reproduced in (Garrett 1990, 74)

97. Bird bottle fragments recovered archaeologically at the Getty site in Colonial Williamsburg, Williamsburg, Virginia were interpreted with the help of a French man's letter. In 1767 Philip Ludwell mentioned Martin Bottles in his will which were made by Rogers in the Jamestown pottery c. 1720-1740. Special thanks to Willliam Pittman in the Department of Archaeological Research and Documentation at the Colonial Williamsburg Foundation for passing me this information) (William Pittman, Personal Communication, June 10,1997)

98. (Silver 1990, 148)

99. (Breeden 1980, 132) Also in a 1774 letter a settler in Georgia reported a 5'8" snake that entered his home and was initially chased out by his chickens. It returned and strangled one. (Ruddock 1993, 32-33)

100. (Topsel 1658, 80-84)

101.A significant number of cat remains have been recovered archaeologically in Virginia. Thirteen in one seventeenth-century well shaft. (Kelso, 1984) The presence of so many cats is indicative of their utility in the area of pest control. The appearance of cats in a well may be indicative of the lack of surgical neutering or other cat population control processes. (Yentsch 1994, 220-222, 241) (Kelso 1984, 217-221)

102. Philip Fithian, a white tutor at Nomini Hall plantation in Virginia, reported that "Tom the coachman came in with a wood Terrapin which he brought to be a resident in our

Room to catch Bugs and Cockroaches." (Fithian 1957, 134) It is significant that this strategy was introduced by "Tom" who was probably an enslaved African-American.

103. (Snetsinger 1983) (Topsel 1658, 170-171)

104. (Yarwood 1981, 113)

105. (Hole 1953, 77)

106. (Garrett 1990, 203)

107. Some of these traps include wasp tongs designed to crush or trap individual wasps between two blades, and the insect bottle trap which resembles an upside down bottle with an inverted neck, supported by short legs or suspended from above. Some sweet agent is placed in the bottle and insects attracted up into the bottle to retrieve it can not find their way out. (Yarwood 1981, 113)

108. "Chests and boxes made of this wood [cypress] do not suffer from moths, or worms. Thus one makes much furniture from this beautiful and durable wood." (Byrd 1940, 28)

109. 1770 January 23 - "Tony has been 2 days morticing Cedar posts for paling in my Garden." (Greene 1965, 348). 1771 June 3, "sent 1 cedar pail and a butter pot to Mr. J. Beale." (Greene 1965, 568)

110. (Garrett 1990, 177)

111. An oil from gum of cedar "is excellent to kill Nits, Lice, or any Insect crept into the Ear,..." (J.H. 1695, GU)

112. (Garrett 1990, 177)

113. The pharmacological treatment of diseases advocated by the descriptions of plants and treatments in herbals was demonstrated in a sixteenth-century Aztec Herbal as well as its European, and later American counterparts. The drugs and other materials used by the Aztecs differed from those used and available in Europe in the sixteenth century, but the preparations and applications (ointments, salves, powders, potions, plasters) were very similar. (Cruz 1940)

114. (Stearns 1801, 251)

115. (Stearns 1801, 62)

116. Hellebore was used to poison crows by boiling some Indian corn with the root and strewing it around where crows feed. (Stearns 1801, 173-174, 176) Also known as Veratrum album, the English call it Itch-reed or Hellebore and, "When the children here are plagued with vermin, the women boil this root, put the comb into the decoction, and

comb the head with it, and this kills them most effectually." March 13, 1749 (Kalm 1972, 247)

117. "Rue of the Meadow: This is to be found on the Borders of Moist Meadows, and by Ditch sides, flowring [sic] towards the end of July and the beginning of August..." "The roots boiled in Water, destroy Lice and Vermin, incident to humane Bodies, by only anointing the places with their Decoction." (J.H. 1695, RU) The description of the place this grows, the fact that the roots are used, and its application suggest that this is hellebore, probably white. Another remedy to ease the pain of Bug bites - re: a treatment for Scabs : "Take the Roots of Celandine, Wormwood, and red Dock, of each a handful; Lawrel and Ivy -Leaves, of each a handful: bruise them well, and fry them in Butter till they become crisp: then strain out the Butter and hard pressing, and keep it as an ointment of special use in all manner of Scabs, Breakings-out, Botches, or Blains; and if mixed with a little Powder of Sulphur, it is excellent for the Itch, and to hinder the biting of Bugs, or cure those that are Bit." (J.H. 1695, SC) "Meadow-Rue. The Root boiled in Water, and the Places of the Body most troubled with Vermin and Lice washed therewith while it is warm, destroyeth them utterly" (Culpeper 16??, 290)

118. (Adamson 1963, 289-294)

119. (Berenbaum 1995, 45) "Tobacco: Though many are ignorant of any use of this Plant than in smoaking, it has nevertheless many other ways if singular Virtue,.."A Bath of it, or the green Leaves applied, cure Leprosie, the Itch, Kills Lice, and heals Wounds, cleanses Ulcers, and takes out the Fire of Scalds, or Burns." (J.H. 1695, TO)

120. "The Juice is also good ...to kill Lice in Children's Heads." (Culpeper 16??, 326) Used externally for "destroying cutaneous insects" (Stearns 1801, 330)

121. (Fearn 1977, 29)

122. "The essential oil, put upon spungy paper, and applied to the skin, destroys cutaneous insects." "The oil, compound tincture, and simple spirit, are kept in the apothecaries' shops." Lavendula Spica, French lavender, Lavendula Gallica have the same properties. (Stearns 1801, 200, 201)

123. (Stearns 1801, 58)

124. (Stearns 1801, 148)

125. Wolf's Bane was cultivated in gardens. (Stearns 1801, 229)

126. "Their seeds and essential oil expel wind, and the former destroys cutaneous insects." (Stearns 1801:,248)

127. "A composition of vegetable oils or animal fats, united together with alkaline livivia in such a manner as to dissolve together in water into a milky, semitransparent liquid." "Rubbed on the skin, it kills all kinds of lice." (Stearns 1801, 304-305)

128. "The Oil thereof (the Head being anointed) killeth Lice, and taketh away Itching of the Head." (Culpeper 16??, 173)

129. Leaves and bark of tree boiled with wine and honey is good "to wash those that are subject to Nits and Lice..." (Culpeper 16?,: 327)

130.CONYZA Fleabane - a genus of the polygamia superflua order...19 species "none of which merit any particular description." (Dobson 1798, Vol. V, 389)

131. CIMICIFUGA "It has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away those insects; and the botanists of those parts of Europe which are infested by them, have long desired to naturalise it in their several countries." (Dobson 1798, Vol. V, 11)

132. "Birdlime, its Preparation and Use. It is a vicid [sic] substance. Prepared various ways, and from various materials; and is used in catching birds, mice and other vermin. That commonly used is made from holly-bark, boil'd 10 or 12 hours; when the green coat being separated from the other, it is cover'd up a fortnight in a moist place, and pounded into a tough paste, that no fibres of the wood is left and wash'd in a running stream till no motes appear, then put it to ferment 4 or 5 days, and skim it as often as anything arises. It may be then laid up for use; in using it, a third part of nut oil, or any thin grease in incorporated with it over the fire." (Saunders 1750, 19)

133. In the nineteenth century, women were advised to add alum to their whitewash to make it even more toxic to flies and other insects. (Adamson 1963, 290)

134. (Keeney 1989, 287) Cited in (Numbers and Savitt, 1989) On March 5, 1772 , Col. Landon Carter purchased a package of medicines from a druggist in London, Hopkins, Jackson, and Toddy (Greene 1965, 657)

135. To kill Lice - "...boil Bacon in a Leaded pot & white Frankincense, of each a like quantity, to the stiffness of a salve, strain it, and keep it for your use." (T.K. 1680, 23) "A cure for WORMS and Cutaneous disorders. Take four ounces of pure quicksilver [mercury], boil it a glazed pipkin,..." (Saunders 1750, 126)

136. (Metz et. al. 1997, 96)

137. (Keeney 1989, 282) Cited in (Numbers and Savitt 1989)

138. "Early colonial medicine was not creative or epoch-making. Nor did it altogether reflect continental medicine. It assumed, by the exigencies of the time, features which were

peculiarly indigenous. Without cities, hospitals, professional contacts, books or instruments the early colonial doctor acquired a resourcefulness, independence of action, courage and ingenuity bred only in the school of real necessity." (Blanton 1930, xv-xvi)

139. See Chapter Two endnote 265. (Plat 1609)

140. Arguments against the purchase of an organ in April of 1752 for a Virginia church included the cost, the lack of an organist, and the impact pests would have on it; "Besides experience had informed us that these instruments could not stand long in this Country. Dust Spiders, and dirt daubers [wasps] would Stop up all the Pipes, and when it should be out of Repair what artificer had we to mend it." Journal of the House of Burgesses, Virginia. Cited in (Greene 1965, 103)

141. Special thanks to Ron Hurst of The DeWitt Wallace Gallery, Colonial Williamsburg Foundation, for this information. (Ron Hurst, Personal Communication, November 12, 1992

142. Force. "Lawes Divine, etc." Tracts vol.3, p. 16 c.1610-1611. Cited in (Blanton 1930, 76)

143. In 1773, Col. Landon Carter, of Virginia ordered one of "T. Gale's Pattent bedsteads on a new Plan, Upholster and Cabinetmaker, Catherine Street. Fit furniture for any room. I want one for my Passage in Summer." (Greene 1965, 786)

144. "In 1785, Thomas Waldron of the Strand [England] patented his method of constructing a bedstead with sliding metal fitments attached to the bed rails and posts. This eliminated the need to use screws and nuts to join the connecting parts which were commonly accepted as the usual hiding places of vermin." (Kurkham 1988, 47, 129) Special thanks to Professor Margaretta M. Lovell, Department of History of Art, University of California at Berkeley for passing me this reference.

145. "Though shifting too oft be a theefe in a house,/ Yet shift slut and sloven for feare of a louse." (Tusser 1580, 176 verse 11 #86)

146. "Fifteen Directions to Preserve Health...(4) Put on your apparrell: which in the summer time must be for the most part silke, or buffe, made of buckes skinne, for it resisteth vermine and contagious ayres: in winter your upper garment must be of cotton or friezeadow." (Trovillion 1946, 55)

147. (Carson 1968, 16-17, 190, 193)

148. (Carson 1968, 198)

149. (Kelso 1984, 18) (Plante 1995, 3) Also, "At first so the records say, during the fledgling time at Jamestown construction of very impermanent shelters, indeed, no more

than rotten canvas tents - sufficed.. Documents mention also one-room, wattle-and-daub huts with thatched roofs supported on 'cratchets', or forked pales, or 'punches sett into the Ground and covered with boards so as a firebrand is sufficient to consume them all.'" (Kingsbury 1935, Vol. IV, 259)

150. Researchers have proposed a range of suggestions to explain the seeming lack of permanent homesteads built in Virginia, especially in the seventeenth century. Although, on occasion, the wealthy and powerful constructed substantial permanent dwellings, often brick, in general, a pattern of impermanent construction prevailed. The transient nature and attitude of settlers, the high death rate, the high cost of labor, and the availability of skilled labor may all have contributed to the development of this pattern. (Kelso 1984, 18-19)

151. (Kelso 1984, 19) (Carson, et al. 1981) (Plante 1995, 3)

152. (McAlester 1984, 42)

153. (Kelso 1984, 19) A "proper" English home bears the characteristics of one described in 1684 from Pennsylvania: "There must be eight trees of about sixteen inches square and cut off to posts of about fifteen foot long which the House must stand upon; and four pieces, two thirty foot long and two of eighteen foot long plates, which must lie upon the top of those Posts the whole length and Bredth of the House for the Gists [joists] to rest upon. There must be ten Gists of twenty foot long to bear the loft and two False plats of Thirty foot long to lie upon the ends of the Gists for the Rafters to be fixed upon, twelve pair of rafters of about twenty foot to bear the Roof...for covering the house...we use clapboards of Five foot and a half long." (Carson, et al. 1981, 143-144)

154. (McAlester 1984, 33-34) (Kelso 1984, 19)

155. (Kelso 1984, 23) Also, "The private buildings [in Virginia] are very rarely constructed of stone or brick; much the greatest proportion being of scantling and boards, plaistered with lime. It is impossible to devise things more ugly, uncomfortable, and happily more perishable. There are two or three plans, on one of which according to its size, most of the houses in the state are built." Thomas Jefferson, Thomas Notes on the State of Virginia 1794, p.221. Cited in (Kelso 1984, 23)

156. Re: malting and storing malt, Markham advises against wood storage rooms, and even mud, clay or loam because they might be mixed with hay, straw or litter which "are as great breeders of Wormes and Vermine as wood is, nor are they defences against Mice, but easie to be wrought through, and so very unprofitable for any Husband or Housewife to use." (Markham 1649, 225)

157. "Within a few years of their arrival in the Chesapeake, householders began to move the service areas of their dwellings into separate outbuildings. This removed heat. Offending odors, and noxious vermin from the house and enhanced personal comfort,

health and food storage conditions. (Linebaugh 1994, 1) "Environmental motivations for the development and use of multiple detached outbuildings for service related functions resulted in the large variety of service buildings as colonists experimented with building design and construction in their effort to better their living conditions in the warm and humid Chesapeake region. This experimentation began soon after initial settlement and occurred as a direct response to primary needs of food and food storage and later was spurred by a desire for increased comfort and privacy within the dwelling house as the Chesapeake region became more permanently settled." (Linebaugh 1994, 15)

158. (Carson 1968, 14) (Plante 1995, 4) Some evidence for outbuilding kitchens, or at least cooking in a building separate from the main dwelling house was recovered at a c.1650 Kingsmill site. (Kelso 1984, 129) (Linebaugh 1994)

159. "...but for the kitchen in the country, where there is room enough, I think it better to join it to the house, than either to have it in or underneath it, because of the smells (especially in the hot weather) that it sends into the house:" (Waller 1763, Vol. II, No. II, February p. 86) Also, "...with Timber also are built Houses for the Overseers and Outhouses; among which is the Kitchen apart from the Dwelling House, because of the Smell of hot Victuals, offensive in hot Weather." (Jones 1724a, 36), Also "All their Drudgeries of Cookery, Washing, Diaries, &c. Are perform'd in Offices detacht from the Dwelling - Houses, which by this means are kept more cool and Sweet." (Beverley 1705, Book IV, 53) (Linebaugh 1994)

160. (Carson 1968, 15)

161. (Plante 1995, 7)

162. (McAlester 1984, 48)

163. (McAlester 1984, 50)

164. (Plante 1995, 7)

165. Account book includes entries for 1793 Lathing and plastering of his dairy. (Bolling 1792-1795)

166. "Whatever the finish, walls and ceiling [in kitchen] were customarily whitewashed about every six months, with successive layers of whitewash covering everything...plaster, sheathing, open framework, and even brick nogging between the studs." (Carson 1968, 16)

167. (Smith 1753, 366-368)

168. Consider (Halfpenny 1730) and (Langley 1751)

169. (McAlester 1984, 75, 82)

170. (McAlester 1984, 82)

171. (Yentsch 1994, 98)

172. (Metz et. al. 1997)

173. "The steeply pitched roofs were a surviving Medieval development for thatch covering, which must be steep to shed water. In America the earliest roofs were also of thatch, but the ice, snow, thunderstorms, and high winds of the more severe New World climate soon made wooden shingles the preferred roofing material. The high pitch, now without function for relatively impervious shingle roofs, persisted for nearly a century." (McAlester 1984, 106, 28)

174. (Jones 1724a, 32)

175.(Beverley 1705, Book IV, 53)

176. (Kelso 1984)

177. (Kelso 1984, 107)

178. (Kelso 1984, 105)

179. "This [sand] may be evidence of a food-preservation technique advocated by John Worlidge in a late seventeenth-century treatise on agriculture: 'root crops be laid up in your cellar or such places in heaps...in reasonably dry sand, will keep throughout the winter.'" (Kelso 1984, 117)

180. 1770 Landon Carter of Sabine Hall indicated his awareness of slave root cellars by ordering a search of them for a stolen pot of butter: "I sent Billy Beale to search all their [slaves'] holes and boxes; and in their loft it was found,..." Cited in (Kelso 1984, 201)

181. c. 1700 Bray site at Kingsmill had brick-lined drainage sump in the basement and a buried barrel on its side that "apparently served as a sump." (Kelso 1984, 85)

182. (Kelso 1984, 150-151)

183. Special thanks to Dr. Marley R. Brown III, Director, Archaeology Department, The Colonial Williamsburg Foundation, for this information. (Marley R. Brown III, Personal Communication, April 9 and June 12, 2001)

184. (Kelso, 1984)

185. (Yentsch 1994, 97)

186. (Kelso 1995)

187. A large irregularly shaped pit used for dumping trash also served as a "collect" for a drainage ditch that ran into it at the Kingsmill quarter for slaves. It created a pond of standing stagnant water. The muddy pit may have been allowed to stand for the convenience of hogs. "It is difficult to imagine the quality of domestic life in the midst of such a potential mosquito breeder." (Kelso 1984, 172)

188. Bolling's eighteenth-century account book includes multiple entries for digging and cleaning out drainage and boundary ditches. (Bolling, 1792-1795) (Metz et. al. 1997, 37)

189. (Greene 1965, 530)

190. (Farish 1945, 109) "The preparation of bedding areas for plants required the addition of drainage material, and in some cases oyster shell was added whose function may have been to alter the soil's pH. The brick paving also needed a base which oyster shell and household refuse provided." (Yentsch 1994, 108)

191. There is evidence of such a garden fence at the seventeenth-century Littleton settlement at the Kingsmill site. (Kelso 1984, 143)

192. (Kelso 1984, 147-148)

193. (Kelso 1984, 135)

194. (Kelso 1984, 157)

195. (Hawke 1988, 13)

196. (Tyler 1946, 100-101) (Beverley 1705, Book III, 12)

197.( Lorant 1946, 94)

198. (Wright 1966, 294) See also Chapter Two endnote 35 (Hamor 1615)

199. (Kalm 1972, 206) (Wright 1966, 294)

200. Byrd refers to Indians as "uncleanly people." (Wright 1966, 294)

201. (Mereness 1916) (Drake, 1852)

202. (Mereness 1916, 385) (Wright 1966, 294) (Tyler 1946, 100, 101) (Beverley 1705, Book III, 2 , 7, 10) (William Balderson, Interpreter, Jamestown Island. Personal Communication August 26, 1993)

203. "Of the Diseases, and Cures of the Indians" in (Beverley 1705, Book III, Chapter X, 52)

204. (Wright 1966, 294) (Tyler 1946, 100) (Beverley 1705, Book III, 2, 7)

205. (Lorant 1946, 182-183)

206. (Hawke 1988, 12) (Tyler 1946, 101) (Silver 1990)

207. (Tyler 1946, 23)

208. (Beverley 1705, Book II, 34) This text in Beverley is followed by an illustration of Native Americans fishing with a fire burning in the center of their canoe. This is a Theodore De Bry engraving of a John White painting circa 1585 that also appeared in (Hariot 1608).

209.(Tyler 1946, 12, 100-101) (Beverley 1705, Book III, 12, 16)

210. (Tyler 1946, 101) (Kalm 1972,206)

211. (Tyler 1946, 23, 101) (Beverley 1705, Book III, 2, 7, 10)

212. The Native Americans may not have bathed for reasons of personal hygiene. Indians may, for example, have believed it had healthful, or spiritual benefits. Nonetheless, the activity would have resulted in intentional or unintentional improvements in personal cleanliness.

213. (Beverley 1705, Book III, 16)

214. (Wright 1966: 292)

215. Mouffett advised that to repel flies, the afflicted should rub cattle with fried oil, or lion's grease, or Origanum, or wild Marjoram, or juice from the leaves of a gourd, powdered bayberries boiled with oil, and drivel or foam from an ox or a horse should repel flies. (Mouffet 1658, 947)

216. Jacques Le Moyne de Marques in 1564. (Lorant 1946, 36)

217. (Murrin 1990, 15-16)

218. "Letter of John Pory, 2/30/1619 to Sir Dudley Carleton." Cited in (Tyler 1946, 282)

219. "Letter of John Pory, 2/30/1619 to Sir Dudley Carleton." Cited in (Tyler 1946, 285)

220. (Yentsch 1994, 173)

221. "Most adult slaves in the Chesapeake throughout the 1720s, however, were immigrants. Russell Menard estimates than an average of 300 a year arrived from 1695-1708; then the trade increased. Wax estimates 25% of the population on Maryland's Western Shore was black ca. 1710; by 1750 it was close to 40%..." "Most were men..." (Yentsch 1994, 173) "In rural Maryland ca. 1730, nine out of ten black men and almost all black women worked in the fields; most were born in Africa, but a few were one generation removed, possibly two." (Yentsch 1994, 173-176)

222. Slaves "mapped their world within an African frame of reference. That is to say, they measured distance by days of travel, used nature as a clock, and remembered years by distance and outstanding events: a flood, a war, a drought." (Yentsch 1994, 176)

223. (Yentsch 1994, 186-188)

224. (Yentsch 1994, 203-204)

225. (Yentsch 1994, 187)

226. (Yentsch 1994, 176)

227. (Yentsch 1994, 187)

228. (Savitt 1978, 35-39) Studies conducted during and after the Korean War indicate that blacks have poorer cold adaptive responses than do whites in the following ways: their metabolic rates do not increase significantly until after whites', and even then they do not rise as much; their first shivers (one of the body's defensive responses to cold) occur at a lower skin temperature than for whites; and their incidence of frostbite is higher and their cases more severe than those of whites. (Savitt 1978, 38)

229. (Linebaugh 1994)

230. (Mackie 1992, 1)

231. (Patterson 1989, 152-153)

232. (Personal Communication, Slave Quarter Interpretive Staff, Carter's Grove, Williamsburg, VA, 1993))

233. (Linebaugh 1994) (Mallis 1982, 321, 101, 13) (Silver 1990, 155-156)

234. (Dr. Norman Fashing, Biology Department, The College of William and Mary, Personal Communication, 1993)

235. Cited in (Savitt 1978,104)

236. (Savitt 1978, 58)

237. (Breeden 198,: 201, 202)

238. (Savitt 1978, 51)

239.(Savitt 1978, 58)

240.(Savitt 1978, 50)

241. (Savitt 1978, 50)

242. (Savitt 1978, 71)

243. The trauma caused by bed-bug bites included physical illness and disfigurement. As Queen Victoria's bug-destroyer reported, "I've known persons to be laid up for months through bug-bites. There was a very handsome fair young lady I knew once, and she was so much bitten about the arms, and neck, and face, that her eyes were so swelled up she couldn't see." Cited in (Boynton 1965, 16) The following example demonstrates the importance of preventing infestations for the woman quoted, who was greatly distressed by the effects of bedbugs. "I slept, mercifully, not well, but some. On looking, however, at my fair hand in the morning, as it lay outside the bedclothes, I perceived it to be all - what shall I say? elevated into inequalities, significant of much! My pretty neck, too, especially the part of it Babbie used to like to kiss, was all bitten infamously...I went this morning (while a man was taking down my bedstead to look for the bugs, which were worse last night, of course, having found what a rare creature they had got to eat) and investigated another lodging...And now dear, if you think my letter hardly worth the reading, remember that I my bug-bitten and bedeviled. Cited in (Boynton 1965, 21). (Beecher 1841) (Boynton 1965) (Garrett 1990) (Mackie 1992) (T.K. 1680) (R.W. 1688) (W.W. 1680)

244. For example, in 1772 a London merchant shipped fourteen 3'7" x 2'7" iron wire screens to Robert Beverley in Virginia (Carl Landsburg, Colonial Williamsburg Foundation, Historical Research Department, Personal Communication) [Drawn from on original manuscript in the Library of Congress] In addition, the Yorke County Probate Inventories for 1649-1729 list; James Burwell 1718, "a set of musketo curtains", and Thomas Hornsby 1773, "1 sett Old Gauzes [sic] Curtaines." (Mason 1937)

245. Benjamin Henry Latrobe reported this practice, as did a visitor to New Orleans at a somewhat later period; "Many ladies are accustomed during the summer months, to get after breakfast into a large sack of muslin tied round the throat, with smaller sacks for the arms, and sit thus at work or book, fanning themselves to protect their faces. Others sit all morning on the bed, within their moscheto [sic] curtains" In addition, "Green muskito netting for Bed Curtains or Windows for Blinds" was advertised in Annapolis in 1759, while William Hugh Grove mentioned that while traveling in Virginia in 1732 he saw "Wire and Gauze blinds which keep out the flies but admit the air," and Thomas Jefferson installed wire window screens to keep out insects at Monticello and at the White House. (Garrett 1990, 200-202)

246. Asparagus greens suspended above a table were intended to attract insect pests away from diners. (Garrett 1990, 201)

247. (Beecher 1841) (Boynton 1965) (Carr et al.. 1991) (Garrett 1990) (Mallis 1982) (T.K. 1680) (R.W. 1688) (W.W. 1680)

248. (Upton 1979) (Neiman 1980 and 1986) (Smith 1982) (Linebaugh 1994)

249. (Linebaugh 1994)

250. (Savitt 1978, 83)

251. (Savitt 1978, 71)

252. (Garrett 1990)

253. (Savitt 1978, 71)

254. On "overlaying" see (Savitt 1978, 122)

255. (Breeden 1980, 266)

256. (Yentsch 1994, 236)

257. A South Carolina planter remarked in 1857 that hogs and chickens were good scavengers and should be allowed free access to slave quarters during the daytime. (Breeden 1980, 132)

258. Jobson, Richard. The Golden Trade. London: Nicholas Oakes, 1623:38. Cited in (Yentsch 1994, 213) (Yentsch 1994, 214, 236-237)

259. (Thompson 1984, 134-135)

260. Special thanks to Professor Grey Gundaker of the American Studies and Anthropology Departments of the College of William and Mary for this information. (Grey Gundaker, Personal Communication, 1993)

261. (Savitt 1978, 20)

262. (Breeden 1980, 150-162)

263. (Thompson 1984, 143-145)

264. The possibility of head lice infestation among African Americans has been subject to debate. One scholar concluded that "The Pediculus humanus nigritarum, or head louse of the African Negro, is slightly different from the head louse found on European and

American heads." (Zinsser 1935, 175) A second researcher concluded that head lice infestations were physically impossible among African-American populations because the nature of their hair follicles and hair shafts was not appropriate for lice to attach their nits. (Mallis 1982) However, a representative from the National Pediculosis Association reported that head lice infestation was possible among African Americans, although, due to the nature and texture of their hair, the incidence of infestation tends to be lower. (Personal Communication, 1993)

265. (Abrahams et al. 1983, 19)

266. (Savitt 1978, 72)

267. From the master's perspective, not only were lice a health problem, they were an economic liability as they caused a slave to be found "scratching his head,...when he should be at his task." (Breeden 1980, 152) (Breeden 1980, 151, 152)

268. (Genovese 1972, 552)

269. (Savitt 1978, 83)

270. Native Americans and Euro-American farmers are known to have burned fallow fields and woods near their homes as a means of keeping down fleas and other pests. "The fire of the burning of old Grass, Leaves, and Underwoods consumes a Number of Serpents, Lizards, Scorpions, Spiders and their Eggs, as also Bucks [bugs], Ticks, Petiles [reptiles?], and Muskitoes, with other Vermins, and Insects in General very offensive, and some very poisonous, whose Increase would, without this Expedient, cover the Land, and make America disinhabitable." (Savitt 1978, 63) (Ferguson 1992, 72)

271. (Ferguson 1992, 75)

272. (Yentsch 1994, 189)

273.Cited in (Ferguson 1992, 79)

274. (Ferguson 1992, 81)

275. (Patterson 1989, 162) (Savitt 1978, 51)

276. (McDaniel 1982, 104)

277. (Savitt 1978, 59)

278. (Savitt 1978, 61)

279. (Breeden 1980, 127)

280. (Ferguson 1992, 72)

281. (Kelso 1984, 30)

282. (Breeden 1980, 19)

283. (Breedan 1980, 130-131) "...leftover food, decaying exposed in the sun or under a slave cabin, formed an excellent breeding ground for bacteria and animal parasites, as well as for worm and insect larvae." (Savitt 1978, 71)

284. (Gates 1987, 16)

285. From a nineteenth-century guide to "Negro health."Cited in (Savitt 1978, 60)

286. Journal of Commerce, Cited in (Olmstead 1984, 81-82, Footnote #5)

287. (Westmacott 1992, 22)

288. (Silver 1990, 182)

289. (Hoy 1995, 55)

290. (Westmacott 1992, 80)

291. (Breeden 1980, 182)

292. In a late seventeenth-century account of West Africa, Bosman reported that although they like to eat dog-flesh, people " 'Like cats and find them useful; they do not eat them." Bosman, William. 1705 A New and Accurate Description of the Coast of Guinea.. second ed. London, J. Knapton, 1721 p.227. Cited in (Yentsch 1994, 203)

293. (Breeden 1980, 134, 123)

294. (Breeden 1980, 152)

295. (Thompson 1983, 9,11)

296. (Thompson 1983, 87, 134-138)

297. Special thanks to Professor Grey Gundaker of the American Studies and Anthropology Departments at the College of William and Mary for this information from her personal research notes and observations. (Grey Gundaker, Personal Communication, 1994)

298. "So long as there is uncertainty in life that science and technology fail to control, there will be attempts to deal with it through the supernatural. The historical study of this

cultural universal is important for precisely that reason. Folk beliefs reveal people's anxieties and their efforts to alleviate them. Studying folklore can help us understand a culture on its own terms." Gorn cited in (Numbers and Savitt 1989, 298)

299. "In all cultures the chaos and uncertainty of life predispose the poor, sick, and the socially marginal to heightened faith in superstition. Folk beliefs, then, were encouraged by the material circumstances of bondage and by the slaves' lack of control over their daily lives." Gorn cited in (Numbers and Savitt 1989, 298)

300. Gorn cited in (Numbers and Savitt 1989, 302)

301. Gorn cited in (Numbers and Savitt 1989, 317-318)

302. (Breeden 1980, 128)

303. (Thompson 1984, 222)

304. (Yentsch 1994, 33)

305. "Yard and areas in close to house were relatively clean...an emphasis on housecleaning utensils in the Calvert inventories and Pan African and West African traditions for the use of "compound" space including regular cleanings blur the sense of whose idea it was to keep space clean. (Yentsch 1994, 111) "The elaborate treatment of the kitchen yard was one means whereby domestic activity at the site was set apart from domestic activity at other Chesapeake homes. Its cleanliness too was distinctive, but this was perhaps a consequence of West African cultural tradition and nothing that the Calverts intended." (Yentsch 1994, 110)

306. Slave masters often required regular bathing, cleaning, sweeping, bedding aired, houses whitewashed, and the ground raked and sprinkled with lime. These practices increased in the eighteenth and nineteenth centuries. (Blanton 1931, 160)

307. (Yentsch 1994, 212)

308. (Perdue et al. 1976, xlv)

309. A significant exception to this pattern is seen in the "shoo-fly" chair. These modified chairs were used in the colonial era to cool the occupant, and fan flies away. (Hinkley 1960) (Wood, 1966) One the one hand, it shows a concern for the immediate comfort of a single person. On the other, it is an ingenious adaptation of work space so that the laborer need not be subject to the conditions of the work environment. In this way it shows an attempt to establish personal boundaries between the worker and others in the area.

## ENDNOTES FOR CHAPTER FOUR, PAGES 170-204

1. (Douglas 1966: 4)

2. Georges Bataille. "Abjection et les Formes Misérables," Essais de Sociologie Oeuvres Completés. Paris, Éditions Gallimard, 1970, Vol. II p.217. Cited in (Ward 1992, 22)

3. (Yentsch 1994, 10, 25-27)

4. "People dislike insects for obvious reasons. Insects, more than any other recognizable type of organism, can gain access not only to the homes of humans but even to their bodies, and invasions of privacy are not generally welcome irrespective of the taxonomic identity of the interloper. In addition, insects, being in general so small, are difficult to keep track of; an inability to monitor their movements and their population growth tends to discomfort home owners. Finally, there are real arthropods that pose a serious threat to health and well-being, both by direct injury (as in the case for venomous biting or stinging arthropods) and by indirect injury (as in the case for disease vectors)."(Berenbaum 1995, 300)

5. (Barton, 1909: Vol. I p.R1-R4)

6. "Our country teems with more destructive insects and animals than Europe. 'Tis difficult for us to guard against them all. What man sows must be done here, as well as everywhere else, at the sweat of his brows; and here he has many more enemies to defend himself from than you have in Europe. The great woods with which our country is replenished affords them a shelter from which we cannot drive them. Such is the nature of man's labours and that of the grain he lives on that he is obliged to declare war against every ancient inhabitant of this country. Strange state of things!" (De Crèvecoeur 1986, 269) "Now if you unite the damages which we yearly suffer from all these enemies [pests], to the badness of our fences, to the want of subordinate workmen, to the high price of our labour, to the ignorance of our tradesmen, to the severities of our winters, to the great labours we must undergo, to the celerity with which the rapid season hurry all our rural operations, you'll have a more complete idea of our situation as farmers than you had before. Some part of the rich landscape will gradually fail, and you'll soon perceive the lot of the American farmer is very often unjustly envied by many Europeans who wish to see us taxed, and think we live too well. It is true that no people feed on better pork and bread, but these are in general dearly earned." (De Crèvecoeur 1986, 271)

7. The injunction against marrying Indians was evident in the "Letter of John Rolfe to Sir Thomas Dale, 1614" in which he defended his decision to marry Pocahontas. (Tyler 1946, 235-244)

8. The British traded with the Dutch in the early part of the seventeenth century, and in fact the first African Americans in America were sold to settlers at Jamestown from Dutch ships. (Tyler 1946, 282) from "Letter of John Pory, 1619" p.279-288. Also, Italians were employed at the Jamestown glass works and Frenchmen were employed in the business of

silk and wine production in Virginia. A letter of March 1622/3 from George Sandys of Virginia to Mr. Farrer by the Hopewell. Cited in (Kingsbury 1935, Vol. IV p.24) Also, in 1613 British ships from Jamestown Virginia, under the direction of Samuel Argall, drove French settlers from areas of the New World within the limits of their [King James'] patents. This included areas as far north as Maine, yet still south of what the British considered the boundary of New France's territory. Exactly who had proprietary rights to this land is not entirely clear, as was articulated by a Jesuit priest, Father Biard, who reported on the British assault on a new missionary colony at Mount Desert Island, "Virginia is that land which our forefathers called 'Mocosa' between Florida and New France under the 36th, 37th and 38th parallels of north latitude. This country was first discovered and taken possession of by Jean Verazan in the name of Francis the First, but the English having explored it since then, finally came to inhabit it only seven or eight years ago. Their principal settlement, which they call Jamestown, is about 250 leagues distant in a direct line from St. Sauveur where we were located. Judge if they have any good reason for quarreling with us." "Samuel Argall: A Ship from Jamestown Drives New France Out of New England, 1613." Cited in (Viereck 1967, 152). In addition, Argall attempted to assert British authority in the New World when he plundered French ships, took prisoners back to Jamestown, returned to the northern coast and destroyed buildings at St. Croix and Port Royal, and he also stopped at Manhattan and ordered the Dutch to pull down their flag and replace it with a British one. A portion of the northeastern territory in question was subsequently named New England in 1614, (rather than New France or New Holland) to reflect the British claim to the region. These moves were violent but effective maneuvers for the British and their claims to territory in the New World. However, they are somewhat surprising given the difficulties in surviving settlers at Jamestown were encountering themselves at the time. (Viereck 1967, 153) British claim to these and other New World territories was continually contested through the seventeenth and into the eighteenth centuries. Some of their claims were settled, "By the treaties of Breda (1667) and Westminster (1673) the English gained control over all of the Dutch lands in North America. These possessions included the land of the Iroquois. The Iroquois reaffirmed their possession by the Dongan Treaty (1684) and the sale of their lands to the English in 1701. Again this English sovereignty was reaffirmed in particular in the Lancaster Treaty (1744) and Aix-la-Chapelle (1748) returned the French and English territory in North America, which was gained by wars between them, to the respective owners before their conquests." 1755 preface to Pownall's first edition of *The Administration of the Colonies*, published in 1776. Cited in (Pownall 1949, 3) In addition, in the second supply of settlers to arrive at Jamestown, in 1608 there were "8 Dutchmen and Poles," and another 4 Dutchmen arrived in December of 1608. "Description of Virginia and Proceedings of the Colonie." Cited in (Tyler 1946, 160, 163) Frenchmen worked with and among the British setting up vineyards and making wine, some were seated at Buckroe near Point Comfort. "A Genrall Historie of Virginia" by Smith, p.289-408. Cited in (Tyler 1946, 350 footnote #2). Dutchmen were sent to Virginia to help with building. (Kingsbury 1933 Vol. II p.456, 502, etc.) Vingerons were imported from France 1620. (Kingsbury 1933, Vol. II p.315, 502, 507, 532).

9. For example, following the 1622 assault on European settlements by Native Americans, the Europeans moved closer to one another and to forts and other protected areas for safety. This also had the effect of increasing opportunities for the transmission of illness and infestations. The Virginia Company Discourse of the Old Company, April 1625. Cited in (Kingsbury 1935, Vol. IV p. 525)

10. "Despite the resistance to change, the diet became Americanized within the first generation of settlers. First, they took from the Indians all they grew and the recipes for making it palatable." (Hawke 1988, 76)

11. (Hawke 1988, 37-38) Settlers girdled trees to clear land in the Chesapeake. This practice was not unknown in England, but the settlers probably picked up the practice in the Chesapeake from the Indians. (Hawke 1988, 33)

12. Approximately forty percent of the immigrants to the Chesapeake area were indentured servants. Most of these settlers were young, members of the working class, and trained with few specific skills. In 1619 there were only 20 blacks in Virginia. Thirty years later there were about 5000. By 1670 some say about 2000 blacks were in Virinia, but others say that is an exaggeration. By 1680 the population of blacks in Virginia reached 3000, and by turn of the century there were more than 6000. (Hawke 1988, 120-121, 127)

13. Consider the note of John Pory in 1619 who reported that in Virginia people were prospering to such a degree that he saw a cow keeper go to church "all in freshe flaming silke", and the wife of a collier who "weares her rough bever hatt with a faire perle hatband, and a silken suite thereto correspondent." Letter of John Pory [1st Secretary of Virginia] to Sir Dudley Carleton, February 30, 1619.p. 279-288. Cited in (Tyler 1946, 285) At the time administrators began enforcing the new charter and laws in 1619, they stressed the issue of apparel, again, "against excesse in apparell that every man be cessed in the churche for all publique contributions, if he be unmarried according to his owne apparell, if he be married, according to his owne and his wives or either of their apparell." Proceedings of the Virginia Assembly, 1619 p.245-278. Cited in (Tyler 1946, 263)

14. "In the end, neither dress, lineage, education, nor even political position determined a man's social rank. Wealth, more often than anything else, set men apart." (Hawke 1988, 114)

15. "The vistas, the ornamental gardens, and the orangery served the needs of politically powerful individuals by displaying their mastery over nature, by denoting that the center of power in the town was indeed the center, by visually reminding men and women of the way Chesapeake society was structured." (Yentsch 1994, 130)

16. (Brown 1898, 131) (Cable 1969, 22) (Blanton 1930, 75-76, 47) Cited from Force: Tracts, V.3, "Lawes, Divine, Moral and Martiall," 1610-1611, 15-16.

17. "We built also a fort for a retreat [Smith Fort across the James River from Jamestown, a mile up Grays Creek], near a convenient river, upon a high commanding hill, very hard to be assaulted, and easie to be defended: but ere it was half finished, this defect caused a

stay. In searching our casked corn, wee found it halfe rotten: and the rest so consumed with the many thousand rats, increased first from the ships, that we knewe not how to keepe that litle wee had. This did drive us all to our wits ende; for there was nothing in the countrie but what nature afforded." John Smith, 1609 "Description of Virginia & Proceedings of the Colonie" [editor's footnote -"This condition of things was not very creditable to Smith's circumspection."] Cited in (Tyler 1946, 185)

18. John Smith wrote in "A Genrall Historie of Virginia" p.289-408; some time after Nov. 1618 that "Some thirtie or fortie acres wee had sowne with one Plough, but it stood so long in the ground before it was reaped, it was most shaken; and the rest spoiled with the cattell and Rats in the Barne, but no better corne could bee for the quantity." drawn from Hamor's book and attributed to Samuell Argall and John Rolfe. Cited in (Tyler 1946, 332)

19 Smith's A Genrall Historie of Virginia. p.289-408. Lists include mostly food, clothes, tools, and arms. Cited in (Tyler 1946, 393-395)

20. "Wee marched to those smoakes and fond that the Savages had beene there burning down the grasse, as wee thought either to make their plantation there, or else to give signes to bring there forces together, as so give us battell." "Observations by Master George Percy, 1607" p.1-24 Cited in (Tyler 1946, 10-11)

21. (Barton 1909, 122)

22. (Metz et. al. 1997, 28)

23. (Metz et. al. 1997, 28-29)

24. (Yentsch 1994, 30)

25. (Metz et. al. 1997, 28)

26. (Greene 1965, 530) Bolling recorded the many times he paid to have his ditches dug and cleaned. (Bolling 1792-1795)

27. (Metz et. al. 1997, 37)

28. (Hawke 1988, 35) In contrast, New England farmers' fences were permanent and demonstrated a certain commitment to the land for life. (Hawke 1988, 35)

29. "Chestnut and cedar were favored for fence posts because they resisted rotting. Cedar had a further virtue - its lightness made it ideal for shingles and clapboard siding" (Hawke 1988, 144) Hawke makes no mention of the pest repellent properties of cedar or tobacco.

30. "But if with stones thy meagre lands are spread;/ Be these collected, they will pay thy toil:/ And let Vitruvius, aided by the line,/ Fence thy plantations with a thick-built wall./ On this lay cuttings of the prickle pear;/ They soon a formidable fence will shoot:/" (Grainger 1764, Book I, p. 37-38 verses 532-537)

31. "Thy fields thus planted; to secure the canes/ From the Goat's baneful tooth; the churning boar;/ From thieves; from fire of casual or design'd;/ Unfailing herbage to thy toiling herds/ Would'st thou afford; and spectators charm/ With beauteous prospects: let the frequent hedge/ Thy green plantation, regular, divide." (Grainger 1764, Book I p. 34 verses 492-498).

32. Regarding the insect repellent properties of boxwood, Joan Evans reports that eleventh-century monks in France used boxwood clippings to keep flies away. (Evans 1968) However, the English and settlers to the Chesapeake do not comment on this feature of the hedge. I am grateful to Mr. Lynn R. Batdorf, Curator, National Boxwood Collection, U.S. National Arboretum, Washington, D.C. for information about the properties of boxwood related to pest control. (Batdorf, Personal Communication, January 24, 2001)

33. (McAlester 1984, 124) The Dutch double door, which was probably developed to keep out livestock while still allowing air and light in the open top half of the door, was not generally a feature of southern houses. (McAlester 1984, 114)

34. (McAlester 1984)

35. (Kelso 1984, 23)

36. (Kelso 1984, 23)

37. (Linebaugh 1994)

38. Yentsch reported that in the 1770s, "Calvert brought the house into visual accord with the Georgian mansions built in Annapolis during the 1760's." "The changes he made to the house and the yard in the early 1770s almost eradicated its medieval legacy." (Yentsch 1994, 267) In these renovations, the 1730 work yard became a symmetrical formal facade, with a new 1770s large formal octagonal forecourt with strong brick walls. The rennovations also included a cobble-paved entry between the Circle and the entry to his home, a new ninety-degree angled oyster shell path, and raised doors and windows levels. All of the service buildings in the work yard were dismantled, and Calvert expanded the house out over the dismantled orangery. He did extensive landscaping to hide old terraces and level out the yard, moved the facade to the side street and not facing the Circle, and the original ornamental garden became the service yard with a well, privy smokehouse and stable away from the view of the public in the Circle. The pleasure garden was gone, domesticated and reduced in splendor as was the family. (Yentsch 1994, 266-269)

39. (Yentsch 1994, 109)

40. (Kelso 1984, 23)

41. (Deetz 1977) (Bushman 1992)

42. (Bushman 1992, xii)

43. (Bushman 1992, xii-xiii)

44. (Bushman 1992, xiii)

45. For example, key plates decorated with the fashionable Janus motif [Janus was the traditional guardian of portals], were used on doors and locks. They carried classical references into American homes. (Yentsch 1994, 103) These key plates represented a physical, cultural, and even spiritual boundary.

46. "A primary duty of the housewife was to preserve and maintain all these family possessions through a skillful regulation of the household and wise economy." "..a wise housewife kept all valuables, including textiles, silver, porcelain, and household supplies under lock and key."..."...keys...were a symbol of her control over the entire household." (Garrett 199, 172-173)

47. These practices include, for example, horseshoes mounted over doors, or animal hearts full of pins mounted over doors. (Bayne-Powell 1956, 187) One historian pointed out that, "It was customary in some parts of England to leap over it [the threshold], and the bridegroom, bringing home his bride, would often carry her across it. For some reason or other the back door was considered more dangerous than the front, and if you were going to occupy a new house you must never enter by the back or ill-luck would beset you." (Bayne-Powell 1956, 188)

48. For example, a receipt "To make necklaces for Children in cutting teeth" includes wooden beads soaked in wine and dusted with coral powder. (Smith 1742, 163)

49. Defoe described the terror caused by the death-watch beetle, "How many people," he says, "have I seen in the most terrible palpitations for months together, expecting Every hour the approach of some calamity, only by a little worm which breeds in old wainscots and endeavouring to eat its way to makes the noise like the movement of a watch." "On the other hand, houses which were infested by crickets were considered very fortunate and it was thought to be unlucky to kill one." (Bayne-Powell 1956, 191)

50. See Chapter Two endnote 85

51. (Hoy 1995, 10-11)

52. (Bushman 1992, 28-29)

53. (Bushman 1992, 31)

53. (De la Casa 1774, vi)

55. (De la Casa 1774, xvii)

56. For example, touching certain parts of the body in the presence of others was considered not simply impolite, it was indecent. (De la Casa 1774, 9) Furthermore, manners did not just apply to social interaction, they applied to religious and spiritual practices, as well. (Bray 1709) (SPCK 1787) (Seaton 1720) (Salzmann 1796)

57. "For in like manner, as men who consider wild beasts as objects of terror, and disdain to shew any dread of such minute animals as gnats or flies; yet on account of the continued trouble, which those teazing [sic] insects occasion, are more frequently put out of humour [sic] by them, then by those more bulky creatures: So it usually happens, that the generality of mankind are infinitely more distressed by those rustic and untractable mortals, than by men of more notoriously flagitious characters." (De la Casa 1774, 5)

58. (De la Casa 1774, 178)

59. A good summary of the etiquette guidelines that would have impacted the behavior of people troubled by pests was listed in an early eighteenth-century etiquette guide: "Be always cleanly," "Put not thy hand in the presence of others to any part of thy body, not ordinarily discovered," "scratch not thy Head," (Garretson 1701, 25, 38-39, 42) (De la Casa 1774, 9) In the late nineteenth century people were still advised that it was impolite to be "scratching or touching your head," (An American circa 1880, 62)

60. Cited in (Carson 1966, 28) Another anecdote from a member of the Virginia elite helps to establish that knowledge of and a familiarity with body pests was common even among the wealthy, as well as the socially and materially advantaged. Colonel Byrd reported in the eighteenth century on a woman with a "horizontal chest" who equipped herself with an ingenious pneumatic device which rendered her bosom so tight she could crack a louse on it. The device failed, and her bosom suddenly collapsed at a ball, Byrd said with "a sound that was a little unseemly." (Carson 1966, 57)

61. (Garretson 1701) (Salzmann 1796) (Haywood 1743, 11)

62. In the nineteenth century, advice about responding in the situations in which one encounters pests became more detailed and frequent. One woman advised in 1853 that under no circumstances was a guest to report to the hostess when insects were found in a bed, "a circumstance that may chance sometimes to happen even in the best of houses." (Garrett 1990, 206)

63. (Bushman 1992, 38)

64. (Seaton 1720) (Salzmann 1796) (SPCK 1787)

65. (Cable 1969, 13) (Carson 1966, 27) (Garretson 1701)

66. (Cable 1969, 53)

67. (Carson 1966, 41)

68. Some titles of the era included, The Compleat Gentleman 1661 London, The Whole Duty of Man, Boswell's The Life of Johnson, The American Chesterfield, and Letters Written to and For Particular Friends 1741 by Samuel Richardson. (Carson 1966, 23-31)

69. "Almost every man of position in Virginia from the seventeenth century Ralph Wormely down to Washington and Jefferson owned a copy of The Whole Duty of Man."

(Carson 1966, 50) Similar titles were available for women. (Carson 1966, 61)

70. (Reed 1737) [first edition 1701] (Gregory 1784) It was not until the nineteenth century that American printers and publishers began producing American-authored etiquette manuals. (Carson 1966, 23) Some early etiquette publications in America were actually reprints of British authored texts. (i.e. 1696 New York publication of Letters of Advice to a Young Gentleman Leaving the University Concerning his Behaviour and Conversation in the World ). (Carson 1966, 21)

71. A receipt for formula to draw worms and earwigs out of your "head" if they crawled into your ears at night advised, "Worms in the Head: If any Worm, or Earwig, has crept into the Head whilst you sleep, to destroy or bring it away. Take three or four Cloves of Garlick, stamp them in Mortar, or any other convienient [sic] Utensil: then lay them in clean Water to soak awhile, and so wring out the Juice with a clean Cloth, and put a few drops of the Liquor into the Ear; and it will either kill the Worm, and work it out with the Wax, or cause it to come out at the Nose. It is also good for Noises, and Dizziness in the Head, and brings away the Furr and Scurf that many times causes Obstruction in Hearing, and much lessens it." (J.H. 1695, WO)

72. In one eighteenth-century diary, a young lady frequently referenced her own appearance and commented regularly on that of others. (Orr 1871)

73. Remedies to treat a "scald-head" were very common in the sixteenth, seventeenth, and eighteenth centuries. They were often listed among other remedies for scabs on the skin and "the itch." (Markham 1649) (Harris 1684) (J.H. 1695) (Waller 1763) Scald-Head was generally a scalp condition caused by ringworm, tinea (fungus), scrofula or some other similar affliction. There is no evidence in the description of this condition or treatments that people recognized forms of "scald-head" could be caused by an organism, and therefore have some relationship to other body pests and pest control. The condition seems to have been viewed as a purely medical condition. (Simpson and Weiner 1989, Vol. XIV, 558) Also, "To take away Morphew. Take briary-roots, and wake-robin; stamp them with brimstone, and make it up in a lump; wrap it in a fine linen rag, dip it in vinegar, and rub the place pretty hard with it; it will take away the morphew spots." (Smith 1753, 353)

74. For example, in domestic economy prescriptive literature, under the heading "Receipts in Physick," formulas for body, air and linen perfumes, for powders to clean teeth, strategies to grow, or "fatten," perfume, powder, and remove hair; remedies to soften skin, and to improve the complexion were popular. (Markham 1649) (Blencowe 1694) (J.H. 1695) (Brigham 1650s-1730s) (Reed 1737) (Smith 1742) (Smith 1753) (Late A. P. 1754, 153) (Marshall 1931) (Trovillion 1946) (Hess 1981) (Wilson 1984)

75. In 1639, in his memoirs Englishman Thomas Verney asks for "a lace shirt to keep me from lice:" (Willett & Cunnington 1992, 54)

76. (Willett & Cunnington 1992, 54-55) Willett and Cunnington recovered other reasons some English did not care for woolen undergarments; "The apparent dislike of wearing 'wool next to the skin' was perhaps accentuated by the Act of 1678 [in England], which provided that [the deceased] '...must be buried in sheep's wool.' ..The Act was not repealed till 1814....It would have been natural, therefore, that 'wool next to the skin' had disagreeable associations." (Willett & Cunnington 1992, 54-55) Furthermore, wool next to the skin could be itchy, hot, and attractive to nit-laying insects.

77. (Markham 1649, 167)

78. This phenomenon has parallels in disease prevention. Some efforts to control disease for some people actually increased the risk of illness for others. For example, Heyrman found that, "While inoculation improved the chances of surviving smallpox epidemics for the privileged segment of Marblehead society that could pay for preventative medicine, it increased the hazard for those who could afford neither inoculation, nor medical care in the event of contracting the disease, nor the loss of income produced by the illness of family members and the shutdown of commerce." (Heyrman 1984, 316)

79. Drawing of the work of George Glassie, "Anthropologist James Deetz attributes this transformation of hall-parlor frame houses to balanced multi-room Georgian structures as the reflection of a major shift in American culture generally. Deetz sees the seventeenth-century 'medieval' corporate society, where living space was shared and privacy practically unknown, meld into the society of the Age of Reason, where individuality and private space became sacred. Deetz accounts for the development of an American building tradition more by the changing relationship of the American colonials with England than by any local circumstances. During the second half of the seventeenth century as the result of the influence of geographic isolation and English neglect, Americans drifted away from English building models. Then, as the colonies came back under British dominion by the mid-eighteenth century, Deetz believes that the Georgian movement reflected rekindling of an Anglo-American culture. According to Deetz, pottery, gravestones, and music underwent the same cultural transformation." (Kelso 1984, 25)

80. "Gentility heightened self-consciousness, not in any deep philosophical sense, but in the common meaning of becoming aware of how one looked in the eyes of others." (Bushman 1992, xiv)

81. (Bushman 1992, xviii)

82. (Bushman 1992, xiv-xv) Bushman feels that gentility functioned as one means of achieving social power and differentiation, while contributing to a sense of identity, "But at the center of refinement's great power, the reason it could serve all those other functions, was this imagined vision of a noble life once enjoyed by the aristocracy of the Old World. The refinement of America involved the capture of aristocratic culture for use in republican society. Refinement held out the hope of elevation from ordinary existence into an exalted society of superior beings. That promise and hope, rooted in the memory of a forbidden old regime, gave gentility its strength." (Bushman 1992, xix)

83. Advertisements in the Virginia Gazette indicate that "vermin" as well as "mouse" traps, generally imported from England, were available for sale. (Virginia Gazette, April 11, 1766 p. 4 Purdie edition) (Virginia Gazette, Sept. 19, 1766 p.3 Purdie edition) (Virginia Gazette, July 25, 1766 p. 2 Purdie and Dixon edition) (Virginia Gazette, Oct. 11, 1751 p. 4 Hunter edition) (Virginia Gazette, Sept. 28, 1769 p. 3 Purdie and Dixon edition) (Virginia Gazette, Dec. 12, 1771 p. 3 Purdie and Dixon edition) In this era, "vermin" generally designated larger mammal pests like weasels, badgers, polecats, or foxes. Vermin traps were probably not intended for mice, but could probably have taken rats, and may well have been used to regulate rat populations.

One ad for rat poisons claimed that, "The Public are respectfully informed that Mr DAWSON'S famous POWDERS for Destroying RATS, MICE, and other VERMIN, may now be had, wholesale and retail, in packets price 1s. 6d. Each, or six parcels for 8s. Of Messrs. Goadby and Co. Sherborne, and their NEWS-MEN. These Powders are composed of certain valuable ingredients, entirely vegetable, and contain such a fascinating powder, that the animal, having once tasted them, is certain to return, and attract all others in the house, barn, or stable, by his smell, &c. - There are two parcels in each packet, one to allure, the other to destroy. *** No dog or cat will touch these Powders. Rats have been often found lying dead by the Powders." (Moore 1783, 127, 358)

An order of January 15, 1770 from John Robinson of York County, Virginia to the London Merchant John Norton included "1 ps of stuff that will wash & be proper to make 2 suits of Musketo Curtains." The order included the postscript, "If not too much trouble shall be glad you will see to the buying the fish hooks, and stuff for Musketo Curtains as you know what is propr." (Mason 1937, 121, 119). One eighteenth-century description of Virginian houses mentioned that, "The beds had hangings and mosquito nets,..." (Barton 1909, 52).

The June 26, 1776 inventory of his Excellency, Robert Eden Esq. of Annapolis included, "Fly Netts made of White Twine fringed" in the Coachman's Bed Room [these were probably to protect horses and not people]; 2 pair Venetian blinds in the closet of Robert Eden's Bed Room; 2 sets of Venetian Blinds in the Passage adjoining his bed room; and 2 sets of Venetian blinds in the Gilt Leather Parlor. (Hood 1991, 296-400). The December 29, 1773 inventory of his Excellency Governor Tryon's house in Fort George New York included 5 tent bed "Musketto hangings" in the Housekeepers bed chamber. (Hood 1991, 304) The Inventory of his Excellency William Campbell of Charleston, South Carolina [DATE?] included 1 green pavilion in Capt. Innes's Chamber; 1 child's cot with a pavilion, and one green pavilion in the nursery; 1 pavilion in the servants' bed chamber; and 4 window blinds in the loft (Hood 1991, 310-311) Inventory of Francis Fauquier, Esq., 1771-1783 included 1 piece of gauze. (Hood 1991, 296). Inventory of his Excellency Lord Botetourt October 24, 1770 included 2 Venetian blinds in the front parlor; 1 Venetian blind in the closet; 3 Venetian blinds in the dining room; 3 glass lustres with six branches each and gauze covers and 2 Venetian blinds in the Ball room; 1 blue Venetian blind in the Library; 2 yards worstead gauze in the 1st room; 2 Venetian suits of gauze curtains in a closet, and 100 feet fly lattice in the 3rd store room. (Hood 1991, 287-291) George Wythe of Williamsburg, Virginia ordered from the London Merchant John Norton "1o pieces flywire 3 feet 1 inch square." (Mason 1937,

169)

84. (Bushman 1992)

85. Women's responsibilities in the American home included the range of domestic duties for which they were responsible in England, but also extended into the fields.(Hawke 1988, 63)

86. "The Women [in Virginia] are not (as reported) put into the ground to work, but occupie such domestique imployments and housewifery as in England, that is dressing victuals, righting up the house, milking, imployed about dayries, washing sowing, etc., and both men and women have times of recreations, as much or more than in any part of the world, besides, yet some wenches that are nasty, beastly, and not fit to be imployed are put into the ground, for reason tell us, they must not at charge be transported, and then maintained for nothing." John Hammond 1656. Cited in (Hectlinger 1977, 203)

87. "We can be sure that on the women of Virginia homes rested the chief responsibility for the care of the sick - a duty that the advent of specialized nursing has not entirely lifted." (Blanton 1931, 48) Some were not entirely confident of women's skills in administering to the sick and felt compelled to "educate" them in this field, because their "sublime and too high strained applications, leave the Patient in a desperate condition." (T.K. 1680, 2)

88. (Plante 1995, 15-16) (Grainger 1764, 27, Book I, ver. 348-351) (Markham 1649) (Langdon 1937, 323) (Boydston 1990, 12)

89. "Virginia is not only the mother of presidents, but is the parent of good living. Her women of all ranks are famous as housekeepers." Also, "The author places with in reach of all American housekeepers the excellent domestic principles and practices which have long distinguished the home of the 'Old Dominion'." Reviews in (Tyree 1879) under "Notices of the Press," n.p. "The Women [of Virginia] make excellent Wives, and are in general great Breeders." (Mereness 1916, section II, 406)

90. "Women [in Chesapeake] also worked in the fields. Since tobacco was labor-intensive, there was little time for anything else; Chesapeake housewives rarely had time to spin and weave, to sew and cook. The simplest foods, coarse and meager, sufficed; the plainest clothes made do. Men complained because there were not enough women to go around; the sex-ratio was skewed. Rural families bought necessities at storehouses on wealthy plantations where enterprising merchant-planters extended credit." (Yentsch 1994, 10)

91. Regarding gender roles in English culture Gervase Markham maintained that the "perfect Husbandman, who is the Father and Master of the Family, and whose Office and imployments are ever for the most part abroad, or removed from the house, as in the field or yard." While the English Housewife "is the mother and Mistris of the family, and hath her most generall imployments within the house; where from the generall example of her vertues, and the most

approved skil of her knowledges those of her Family may both learn to serve God and sustainman in that godly and profitable sort which is, required of every true Christian." (Markham 1649, 1-2) (Brown 1996, 83)

92. (Davidson 1982, 134)

93. Consider political empowerment called for in 1694 by Mary Astell in "A Serious Proposal to the Ladies for the Advancement of their Greatest Interest," and 1792 by Mary Wollstonecraft in "A Vindication of the Rights of Women." (Davidson 1982, 134, 199)

94. Sept. 13, 1774 "It is curious to see the Girls imitating what they see in the great House; sometimes tying a String to a Chair and then run buzzing back to imitate the Girls spinning; the getting Rags and washing them without water - very often they are knitting with Straws, small round stockings, Garters, &c - Sometimes they get sticks & splinter one end of them f[o]r Brushes, or as they call them her Clamps, & spitting on part of the floor, they scrubb away with great vigor.-" Also, Tues September 20, 1774. "Among the many womanish Fribbles which our little Misses daily practice, I discovered one to Day no less merry than natural; Fanny and Harriot by stuffing rags & other Lumber under their Gowns just below their Apron-Strings, were prodigiously charmed at their resemblanc [sic] to Pregnant Women! They blushed, however, pretty deeply on discovering that I saw them -" Fithian's Journal. Cited in (Farish 1945, 249, 254)

95. "The seventeenth-century girl was trained from childhood to look upon her natural work as a task of supreme importance, in which she could express herself more adequately than in any other way, and to which she must bring all her gifts of character and mind. The principal object of every married woman's ambition was to make a home for her family that was good in every particular - a place were order and cheerfulness flourished side by side with religion, and where good living was to be found in both senses of that phrase."(Hole 1953, 2)

96. (Brown 1996, 27)

97. Philip Fithian. The eighteenth-century tutor for the Carter family boys in Virginia wrote "'Fleas biting! Bugs crawling! - on a hard board, surrounded by a snoring family!'" In "disgust, as part of one of his frequent tirades against the slatternly housewives who tolerated such conditions." (Albion 1934, xiii)

98. (Markham 1649, 4)

99. (- 1798, 278-279) re: domestic economy

100. Wed. Aug. 2, 1775 Pennsylvania. "An eligant [sic] Supper - A Neat House - All Expressions of Welcome - Not a flea not a Chinch, as I know of, within eighteen miles -" (Albion 1934, 85) (Brown 1996 268)

101. (Brown 1996, 41)

102. (Hess 1981, 451)

103. Re: "Compleat Housewife" ..."Containing All the vertuous knowledges and actions both of mind and body, which ought to be in any compleat House-wife of what degree or calling soever." (Markham 1649, title page). Women must be modest, temperate, pleasant, amiable, eat wholesome food, be cleanly, and wear strong comely clothes. (Markham 1649, 1-4)

104. (Lee 1832, vii-xxx)

105. (Markham 1649, 4, 65)

106. (Markham 1649, 62)

107. June 30, 1775. "Yes, a neat Wife is the most desirable of all Wives I do prefer, & when I change my state in the Way, will choose, a Woman famous for domestic Cleanliness above any, I will add, above every other Qualifications! - Good God! A sluttish Woman has too soft an Appellation when she is called 'A slow nauseous Poison'! - Talk of Beauty in a Woman - Talk of Wealth, of Family, of Taste, of Education, of Wit & Parts - Give her every possible natural & adventitious Excellence - But only say she wants family Cleanliness; - I would as soon fall in Love with Milton's Description of Sin!- " (Albion 1934, 43) Also, regarding the presence of fleas in a home, "Moderation itself must quarrel with such female inattention." (Albion 1934, 54) Also, consider newspaper poems in the Virginia Gazette "Choosing a Good Wife" (Purdie and Dixon Jan 21, 1773 p.4, Col.1) Also "The Choice of a Wife" (Purdie and Dixon Dec. 23, 1773) "The Choice of a Good Wife by Cheese" (Purdie and Dixon Aug. 4, 1774)

108. (Kingsbury 1906, Vol I, 428, 391, 256, 257, 496, 485, 566) (Kingsbury 1933, Vol. III, 494, 505) Letter from Tho. Niccolls to Sir Jo Worsenholme April 2, 1623. "Women are necessary members for the Colonye, but the poor men are nev[er] the nearer for them they are so well sould, for I myselfe have ev[er] since my coming payed 3ii ster[ling] ^ An [?] for my washing & find sope. A hard case not having had for all the service I have done the Company not one pipe of Tobacco Consideracon. I am sure for all these women yor poore Tenante that have nothing dye miserablie through nastines & many dep[ar]te the Wor[l]d in their owne dung for want of help in their sicknes. Wherefore for prevention I could wish women might be sent ov[er] to serve the Company for that purpose for certayne yeares whether they marry or no. For all that I can find that multitude of women doe is nothing but to devoure the food of the land without dooing any dayes deed whereby any benefitt may arise either to ye Company or Country." (Kingsbury 1935, Vol. IV, 231-232, 82, 473)

109. (Brown 1996, 31)

110. "But cleanliness was not easy to achieve at home in early America. Servants were indifferent, streets were muddy and dusty, and water might freeze within inches of a roaring fire. The desire for cleanliness among upper-class and middle-class Americans from 1750 to 1870 seems, however, to have been real. It is evident in the enormous quantity and variety of brooms and dustpans, brushes and mops listed in merchants'

inventories, enumerated in the account books of those ordering supplies from abroad, and vaunted in newspaper advertisements. It is evident in the widespread use of casters for tables, chairs, chests, and bedsteads so that they might not only be moved about dexterously but be easy to clean under and around; in the varnished walls, glossy paints, glazed chintz, waxed floors, all of which prolonged cleanliness and facilitated cleaning." (Garrett 1990, 179)

111. "In the eighteenth century, the coveted cleanliness was prescribed in part by an esteem for pleasurable and polite surroundings, inoffensive to eye and nose alike, and by a moral obligation to promote the health of the family by effectually preventing dust and dampness and providing a soul-satisfying order. As the eighteenth century advanced, ventilation and air circulation became increasingly important, and by the final decade the demand was for rooms not only clean but 'sweet', as the emphasis shifted from genteel politeness to a healthful, lung-strengthening, nose-gratifying airiness." "..by the second half of that century [19th] the stress would shift once again to include not only a desire for airy, well-ventilated rooms but a demand for sanitary, germ-free apartments." (Garrett 1990, 179) Drawn largely from (Bushman 1988).

112. H., N. The Ladies Dictionary, Being a General Entertainment for the Fair Sex: A Work Never Attempted Before in English printed for J. Dunton, London, 1694, 457.

113. (Brown 1996, 270)

114. Wed. Aug. 2, 1775 Regarding travel in Pennsylvania: a bed, a neat house, and supper were, "All Expressions of Welcome - Not a Flea, nor a Chintz [bedbug], as I know of, within eighteen Miles - So that this Morning, by God's mercy, I rise in Part recruited from the Ruins of many Days Distress." (Albion 1934, 85)

115. July 13, 1775. "Mrs. Piper keeps a clean House, neat, well fix's Beds, here I have not seen or felt either a Bug, or a Flea." (Albion 1934, 56)

116. Regarding cleaning in the late eighteenth century, "Garretts to be kept as airy as possible, and in summer the beds swept under. If necessary, with lime water: otherwise plain water is sufficient." (Balston 1956, 23)

117. Virginia Gazette ad (Purdie and Dixon September 28, 1769, p.3 and Dec. 12, 1771, p.3) Also, cited in (Carson 1974, 64)

118. One remedy for flyspecks on a mirror was to rub it with a flannel soaked in gin, followed by a dusting with blue powder. Roberts. House Servant's Directory 1827, p.92. Cited in (Carson 1974, 67)

119. A 1785 description of whitewashing by Francis Hopkinson characterizes it as a woman's responsibility. (Hechtlinger 1977, 94-96)

120. (Davidson 1982, 117)

121. "The pre-industrial Colonial era from 1700 until the dawn of the Victorian period in the late 1830's was a time of marked change in domesticity and the broader concept of 'home.' While the cooking hearth continued to be the center of domestic activities and the techniques employed in performing household chores altered very little during this time span, economic prosperity and notable 'political' efforts made by women brought 'home' to the forefront of America culture. This move in turn transformed the middle-class woman's way of life." (Plante 1995, 26) Also, "So it was, in the late 1700s, that hearth and home combined with politics - first in protest and then pursuit of freedom [for example, a boycott of British imported tea and the use of home spun cloth to avoid levies on imported cloth]. As a result, women saw themselves in a new light and their domestic role expanded to include sending good citizens out into the world. In addition, religious overtones fostered 'Christian' homes where morality and politics were closely intertwined." (Plante 1995, 28) "The new spirit of patriotism encouraged an increasing awareness of native foods." (Plante 1995, 28) For example, Amelia Simmons cookbook that included a pumpkin recipe. (Simmons 1796) "Coinciding with this new wave of republicanism was an economic prosperity that fostered genteel femininity." (Plante 1995, 29) For example, in the role of housewife women made a subtle shift from laborer to manager. Faye Dudden, 1983 Serving Women. Cited in (Plante 1995, 29). There was a development of the idea in the early nineteenth century of a home life that was more prosperous, ceremonial, and a safe haven from the encroaching industrial revolution. (Plante 1995, 29)

122. (Davidson 1982, 117)

123. (- 1798, 334) re: cleanliness

124. (DuVall 1988, 192)

125. (DuVall 1988, 193)

126. In 1791 Nicholas LeBlanc developed a process for making sodium bicarbonate from salt. It was an inexpensive form of soda useful for cleaning and making soap. Within a few decades soda, which even worked in cool or tepid water became more common in homes. (DuVall 1988, 193)

127. (Medical 1957, 68-69)

128. (Bushman 1988)

129. Adams, John. Diary and Autobiography of John Adams. L.H. Butterfield (ed.)Cambridge, Mass., Leonard C. Faber and Wendell D. Garrett, 1961, p.193-94. Cited in (Garrett 1990, 179)

130. Randolph, Sarah N. The Domestic Life of Thomas Jefferson Charlottesville, Va. The University Press of Virginia, 1944:45-46. Cited in (Garrett 1990, 179)

131. (Mereness 1916, 451)

132. Fuenmayor et al. trace this phenomenon in the twentieth century, although similar ideas existed in the American colonial era. (Fuenmayor et al., 1992)

133. (Ward 1992, 8)

134. A lack of attention to cleanliness in a woman's personal appearance is often reflected in the appearance of the home, and by implication, to the woman's personal character, as evidenced in this poem, "The lounging house-wife rises in the morning in haste; for LAZY FOLKS are ever in a hurry - she has no time to put on her cloathes properly, but she can do it AT ANYTIME. She drawn on her gown, but leaves it half pinned, her handkerchief is thrown awry across her neck, her shoes down at the heels; she bustles about with her hair over her eyes; she runs from room to room slip shod, resolved TO DO THE WORK and dress herself; but folks who are slip shod about the feet, are usually slip shod all over the house, and all day; THEY BEGIN EVERYTHING AND FINISH NOTHING. In the midst of the poor woman's hurry, somebody comes in: she is in a flutter, runs into the next room, pins up her gown and handkerchief, hurries back with heels thumping the floor! Oh dear you have catched us all in the suds! I intended to have cleaned up before any person came in, but I had everything to do this morning; in the mean time, she catches hold of the broom, and begins to sweep: the dust rises and stifles every soul present. This is ill manners indeed, to brush the dust into a neighbour's face - but the woman is VERY SORRY IT HAPPENED SO. Many a neighbour has thus been entertained with APOLOGIES and DUST, at a friend's house, and where ever this takes place, depend on it, the mistress puts off to ANYTIME, that is, NO TIME, what ought to be done at the PRESENT TIME." (- 1796, 4) re: lounging housewife . Also, in "The Slut" poem, the slut is characterized as never neat, a bad cook, a bad butter maker, and a bad sausage maker. Furthermore, "No broom was in her mansion found,/ But huge tough cobwebs hung around,/ In wreaths and festoons widely spread,/ The work of spiders long since dead./ To sum her character in short,/ She liv'd IN and she liv'd ON dirt." (- 1800, 160) re: slut

135. Regarding actionable slander words in court, "It is say'd by the Court that if it were a new Thing it were reasonable the Word Whore should be Actionable. For no greater misfortune can befall a young Woman whose well being depends upon her having a good Husband than to be reputed a Whore." Oct. 1729. (Barton 1909, R10)

136. (Brown 1996, 29-30)

137. Sept. 19, 1782. "I would not have you think from this that I pay no regard to the opinion of the World; far from it: next to that of good conscience, the opinion of the world is to be regarded. Always pay due regard to that." (Orr 1871, 11) Diary entries in Orr indicate that both men and women were imposing standards of cleanliness, appearance, and behavior upon each other. (Orr 1871)

138. (Palmer 1989, 139)

139. "And, on my soul, I trow that there is none other witchcraft than well doing, and no man can be better bewitched than by giving him what pleaseth him." (Power 1928, 173) "Therefore, dear sister, I pray you to bewitch and bewitch again the husband whom you will have, preserve him from a badly covered house and a smokey chimney, and be not quarrelsome with him, but be sweet, amiable, and peaceful. Mind that in winter he has a good fire without smoke, and that he is well couched and covered between your breasts, and there bewitch him." (Bayard 1991, 64) Alternate translation (Power 1928, 174)

140. (Matalene 1992, 62-63, 584-585)

141. In this case some men were represented as having been deprived of their abilities to hunt, plant, raise animals, etc., while some women's skills in housewifery, maternity, and sexual reputation were compromised (one almost spoiled her butter, one developed breast sores and her infant died, and another was asked to dance naked with the accused). (Brown 1996, 103)

142. (Widdowson 1992, 276)

143. "Familiar to be alwaies in likenesses of a Fly, using the body of a bad creature to far worse purposes." (Mouffett 1658, 932)

144. (Bovenschen 1992, 146, 154)

145. (Bovenschen 1992, 156)

146. (Brown 1996, 27)

147. (Purdie and Dixon October 15, 1772 p. 4, column 1)

148. Some collections of recipes and remedies that eventually found there way into print were drawn from the memories of those who practiced them. (Randolph 1824, xi)

149. The Brigham manuscript, passed from an English mother through several generations of American women, is one example. It included recipes for food, food preparation, medicines, cosmetics, inks and varnishes, as well as information about who provided or benefitted from certain receipts. (Brigham 1650-1730s)

150. A letter from one young woman to another - Oct. 6, 1782, "I have a piece of advice to give you, which I have before urged - that is, to read something improving. Books of instruction will be a thousand times more pleasing [after a little while] than all the novels in the World. I own myself, I am too fond of Novel reading; but by accustoming myself to reading other Books, I have become less so, and I wish my Polly to do the same." (Orr 1871, 26)

151. The most popular cookbooks in Virginia were Mrs. Smith's The Compleat Housewife: Or, Accomplish'd Gentlewoman's Companion, and Mrs. Glasse's The Art of Cookery Made Plain and Easy, as well as works by Mrs. Harrison, Mrs. Raffald, and Mrs.

Bradley. (Carson 1968, xvii).[See Appendix] In 1746 John Mercer of Marlborough made a list of his books, they included "Mays's Cookery," in 1730 he had purchased a copy from Robert Beverley. When his library was sold after his death it did not include the Mays book. However, Mercer did have Richard Bradley's Country Housewife, Elizabeth Smith's Compleate Housewife, and John Evelyn's Discourse on Sallads in his collection. Furthermore, records indicate that he had purchased Mrs. Glasse's book in 1764 at the Virginia Gazette office in Williamsburg. (Carson 1968, xvii) Another book offered for sale in the Virginia Gazette office was Sarah Harrison's The Housekeepers Pocket-Book 1733; 9th ed. In the 1777 6th edition, the author had added Every One their Own Physician. (Carson 1968, xxi)

The Records of the Virginia Company of London indicate that Markham's work, The English Housewife, and Googe's translations in husbandry were sent to Virginia. (Kingsbury 1933, 389) The notation in these records reads "for markams* worke of husbandry and housewifery bound togeather and for the like of Gowges &c." The "like of Gowges" was probably one of Conrad Heresbach's works which Barnaby Googe "Englished and increased," as in one 1614 edition, under the title The Whole Art and Trade of Husbandry Contained in Four Books. Gervase Markham's book was, "Country Contentments in 2 Books, The second entituled The English Huswife 1615." (Simmons 1796, xxi)

The eighteenth-century estate inventory of James Madison Sr., (United States President James Madison's father) mentioned a library of 78 titles which included The Compleat Housewife, and The Country Housewife. Orange County [Virginia] Will Book, 4 p.54. Cited in (Miller 1990 160-166) The catalogue of Robert Carter's library prepared in the late eighteenth century by Philip Fithian included The Compleat Gentleman, Woodward's Natural History of the Earth, Dictionary of Plants, Manners from the French, and other titles that may have had a bearing on pest control and related behavior in the Carter household. (Farish 1945 285-294) Thomas Jefferson's library included several cookbooks. (Kimball 1941, 9)

152. (Carson, 1968, xxii) The Virginia Gazette office also sold other books. For example, on June 1772 Hannah Lee Corbon purchased a copy of Mrs. Raffalds The Experienced English Housekeeper. (Carson 1968, xxvi) Mrs. Martha Bradley's The British Housewife; or the Cook, Housekeeper's and Gardiner's Companion, was also available for sale in Williamsburg by 1770. (Carson 1968, xxvi) Although The Compleate Housewife: Or, Accomplish'd Gentlewoman's Companion was geared towards women, at least some copies of the text survive with male names inscribed in them. A 1751 edition of the book, put out by William Hunter of Williamsburg, Virginia [Hunter was Parks' assistant and successor] was bound together with the 4th edition of Every Man His Own Doctor: or, The Poor Planter's Physician by J. Tennent. The fly leaf included the following inscription: "Joseph Billups, jr. His Book, Bot of a Pedlar at Mathews Court House, July 12, 1812 price 7/6," and the title page says "Alfred Billups' Book." (Yost 1938, 427) (Lowenstein 1972) Male authored domestic economy texts seem to present a complication in that at a very early date, men acknowledged that housekeeping was an arena of feminine skill and competency. However, the social conventions of the era made it inappropriate

for women to publish books. Some felt women had little business working in the writing and publishing field. Some acknowledged the contributions of the original female authors to their texts, but others did not. In Gervase Markham's 1615 The English Huswife he asks "Thou mayst say (gentle Reader) what hath this man to doe with Hus-wifery, he is now out of his element . . . I shall desire thee therefore to understand, that this is no collection of his whose name is prefixed to this work, but an approved Manuscript which he happily light on, belonging sometime to an honorable Personage of this Kingdom, who was singular amongst those of her ranke for many of the qualities here forth. This onely he hath done, digested the things in this book in a good method, placing everything of the same kinde together, so as to make it common for they delight and profit..." Cited in (Hess 1981, 453-454). Many sixteenth- and seventeenth-century English cookbooks read as if authored by women, but almost invariably a man's name appeared on the title page. "This custom of pillaging the ladies family manuscripts started in the sixteenth century when hack writers and publishers discovered the gold mine of recipe books." (Hess 1981, 454) In 1661 Hannah Wooley published The Ladies Directory "which appears to be the first English cookbook to bear the name of a woman author." (Hess 1981, 455). The manuscript tradition was not unique to English women or English cookery, but so many of them getting printed is. (Hess 1981, 455) "What is unusual about England is that so many of them [manuscripts] found their way into print, followed by an extraordinary number of women writers of cookbooks. (Hess 1981 544) In France, male chefs wrote cookbooks with very little attention to home cookery. (Hess 1981, 455)

153. (Menon !767) (Raffald 1786) (Nott 1723)

154. For example, (Digby 1910) (Kettilby 1749) (Cole 1789) which draw from Mrs. Glasse's Art of Cookery, Mrs. Mason's Lady's Assistant, Mrs. Raffald's Experienced English Housekeeper, Mr. Farley's London Art of Cookery, and Dr. Buchan's Domestic Medicine. (Farley 1796) (Carter 1732) (Smith, 1787)

155. (May 1685)

156. (Linebaugh 1994, 12)

157. (Wilson 1984) For example, cookery, physic and herbals were merged in A Book of Fruits and Flowers, Shewing The Nature and Use of them, either for Meat or Medicine. London, printed by M.S. for Tho. Jenner, 1653. This book Included illustrations from de Passe's Hortus Floridus. Simpson's A Booke off Flowers, Fruiets,..., Ruthven's 1639 The Ladies Cabinet Opened, and Dawson's 1569 The Good Huswives Jewell. (Wilson, 1984: xv)

158. "The Printer now begs Leave to inform the Reader, that he hath Collected the following Volume from a much larger, printed in England, which contain'd many Recipes, the Ingredients or Materials for which, are not to be had in the Country: He hath therefore collected only as are useful and practicable here, and left out such as are not so, which would only have serv'd to swell out the Book, and increase its Price. He has printed the Bills of Fare exactly as they are in the English Edition; because the judicious and

expereinc'd in such Affairs, may the better know how to supply the Place of such Materials as are not to be had, with such suitable Things as the Country affords." William Parks 1742 reprint of 1732 5th edition of E. Smith's The Compleate Housewife or Accomplish'd Gentlewoman's Companion orig. 1727. Reprinted through 1773. Cited in (Yost 1938, 425-426) Parks in Williamsburg reprinted an abbreviated version of the 5th edition. His successor in Williamsburg, Wm Hunter printed an edition drawn from the 6th edition in 1752. Advertised as bound with Every Man His Own Doctor. 1775 and in 1775 William Hunter and John Dixon advertised American reprints and British imports of it for sale. (Carson 1968, xx)

The trend towards acknowledging differences in different regions is also apparent in (Waller 1763) who includes information on physic, laws, descriptions of Counties and the most healthful Spots to reside in. He also provides information about brewing, building estimates, trade descriptions, history, stock and grain prices, midwifery, husbandry, gardening, hunting, fishing, fowling, cooking, weather, etc. (Waller 1763)

159. For example, Tobacco, Virginia Snakeroot, and Virginia Snakeweed appeared in several medical remedies, including, (Smith 1753, 262. 267, 279, 332) The Virginia potato was mentioned in 1597 Gerad's Herball.(Wilson 1984, v)

160. (Lowenstein 1972)

161. The first southern cookbook was Mary Randolph's (1762-1828) The Virginia Housewife: or Methodical Cook by Mrs. Mary Randolph. Washington, 1824. (Carson 1968, xxxi)

162. Wilson essay cited in (Simmons 1996, ix)

163. (Pratt 1719, 166-167)

164. For example, 1615 Gervase Markham The English Huswife.(Hess 1981, 453-454)

165. A broad range of responsibilities including cooking, cleaning, cosmetics, dairying, poultry care, glue, varnish, dye, medicine, etc., was outlined in (Saunders 1750), or as Markham described it, "The English House-wife, containing The inward and outward Vertues which ought to be in a compleat Woman. As her skill in Physick, Surgery, Cookery, Extraction of Oyles, Banqueting stuffe, Ordering of great Feasts, preserving of all sorts of Wines, conceited Secrets, Distillations, Perfumes, Ordering of Wooll, Hemp, Flax, making Cloth, and Dying, the knowledge of Dayries, Office of Malting of Oates, their excellent Uses in a Family, of Brewing, Baking, and all other things belonging to an Household." (Markham 1649, title page). Or "directing what is necessary to be done in Providing for, Conducting and Managing a Family throughout the Year." (Bradley 1770, title page). Bradley also included recommendations for women tending the garden about eliminating garden pests. (Bradley 1770, Vol. I, 628 and Vol. II, 134) Chomel also included a section on destroying vermin in the garden, "The Method to take or destroy Vermin and other Animals, injurious to Gardening, Husbandry, and all rural Oeconomy," (Chomel 1725 title page)

166. "The complete vermin-killer: a valuable and useful companion for families, in town and country: containing safe and quick methods of destroying bugs, lice,...To which are added useful family receipts, for the preparation of medicines,...The gentleman farrier; or, directions for the purchase, management and cure of horses. The compendious gardener and husbandman;...The third edition, With considerable additions. (W.W. 1777 edition)

167. "Although the Attempt of publishing this small Tract may at first View seem very inconsiderable, yet the Author or Collector of the ensuing Observations hath been emboldened to bring this small Embrio into the World upon this Consideration, that many times Mankind is more disturbed by these small and Inconsiderable insects herein described than by the more noble Species of Sensitive Creatures, And therefore out of a Special regard to the Convenience of his Fellow Subjects the Author hath thought fit to lay down many infallible Remedies for the Redress of these Grievances, which these meaner sort of Creatures infest the World withal, and such Observations as are deduced not only from the Writings and industrious Practices of many Learned and Judicious Authors, who have been proud in searching into the nature of such small things, but also from the constant Experience of divers Persons who have found the benefit thereof; and He desires that they may take no other Effect than what the Experience of the Reader, when he hath reduced them to practice will naturally produce, val." (W.W. 1680, A1-A2)

168. Special thanks to Russell Martin at the American Antiquarian Society for his contribution to my information on Almanacs, "For Instruction and Amusement: A History of Virginia Almanacs, 1732-1865," Unpublished Manuscript, Index/Outline, The American Antiquarian Society. Personal Communication, December 5, 1996.

169. For example, Virginia Almanacs of 1743 and 1753 included advertisements for The Complete Housewife. (Martin 1996, 1)

170. (Martin 1996)

171. (Martin 1996) (Andrews 1796, 318)

172. Consider, "The Cats---A Curious Story," 1796 (Martin 1996 17)

173. "To remove bugs, 1788: and To destroy rats, 1796 (nin.)" (Martin 1996, 24) "To Cure Bugs. Take a quart of Canary seeds, boiled in a gallon of the best and strongest grape vinegar, till it comes to 2 quarts; first take the furniture down, brush well all the folds and bindings; see that no nits be there which you can brush and rub off, unscrew the bedstead, and with the above ingredients wash well every part of the bedstead. A bedstead will take the whole two quarts; do this in February. Before the bugs hatch, and in October, when they have laid there eggs, and there will never come another bug to that bedstead, and through it swarmed ever so bad before, this entirely clears it." (Andrews 1788, n.p.)

174. Encyclopedia entries for "rat," "nux vomica," "mouse," "insects," "louse," and "bug" provide some insight into period views. RAT - "originally from the Levant, and a new comer into this country - firsts arrival from the coasts of Ireland, with ships trading in provisions to Gibraltar, a single pair enough for the numerous progeny now infesting the

British Empire - ..the black rat as propagated in America in great numbers, introduced from Europe, and are become the most noxious animals there...the nux vomica, ground and mixed with meal, the most certain poison, and least dangerous to kill rats." (Goldsmith 1795, index, n.p. see p. 274) NUX VOMICA - "ground and mixed with meal, the most certain poison, and least dangerous, to kill rats, ...fatal to most animals except man..." (Goldsmith 1795, ii-iii Index, see p. 274, 92) MOUSE - "the most feeble, and most timid of all quadrupeds except the Guinea pig-...no animal has more enemies, and few so incapable of resistance..." (Goldsmith 1795, index, n.p. given) Mouse - "They are animals that, while they fear human society, closely attend to it; and, although enemies to man, are never found but near those places where he has fixed his habitation." (Goldsmith 1795, Vol. II, p.276) INSECTS - "Even in a country like ours [England], where all the noxious animals have been reduced by repeated assiduity, the insects tribes still maintain their ground, and but too often unwelcome intruders upon the fruits of human industry. But, in more uncultivated regions, they annoyances and devastations are terrible." "What an uncomfortable life must the natives lead in Lapland, and some parts of America, where if a candle be lighted, the insects swarm is such abundance, as instantly to extinguish it with their numbers: where the inhabitants are obliged to smear their bodies and faces with tar, or some other composition, to protect them from the puncture of these minute enemies; where, though millions are destroyed, famished millions are still seen to succeed, and to make the torture endless" "All other animals are capable of some degree of education; their instincts may be suppressed or altered; the dog may be taught to fetch and carry; the bird to whistle a tune; and the serpent to dance; but the insect has but one invariable method of operating; no arts can turn it from its instincts; and, indeed, its life too short for instruction, as a single season often terminates its existence. For these reasons, the insect tribe are deservedly placed in the lowest rank of animated nature; and, in general, they seem more allied to the vegetables on which they feed, than to the nobler classes above them." "Many of them are attached to one vegetable, often to a single leaf; they then increase with the flourishing plant, and die as it decays; a few days fill up the measure of their contemptible lives; while the ends for which they were produced, or the pleasures they enjoy, to us at least, are utterly unknown." "Yet while I am thus fixing the rank of a certain class of animals, it seems necessary to define the nature of those animals which are thus degraded." "...we may define insects to be *little animals without red blood, bones or cartilages, furnished with a trunk or else a mouth, opening lengthwise, with eyes they are incapable of covering, and with lungs which have their openings on the sides.*" (Goldsmith 1795, 136-137, Vol. IV) (Goldsmith 1830, Vol. IV, 106) "...we need not be told, that the louse, the flea, and many of these wingless creatures that seem formed to teize [sic] mankind, continue their painful depredations the whole year round." (Goldsmith 1795, Vol. IV, 142) Re: spiders, "In this country, [England] where all the insect tribes are kept under by human assiduity, the spiders are but small and harmless. We are acquainted with few, but the house-spider, which weaves its webs in neglected rooms;...But they form a much more terrible tribe in Africa and America." (Goldsmith 1795, Vol. IV, 143) FLEA - "The history of those animals with which we are the best acquainted, are the first objects of our chiefest curiosity. There are few but are well informed of the agility of the blood-

thirsty disposition of the flea; of the caution with which it comes to the attack; and the readiness with which it avoids the pursuit." they hatch with "powers to disturb the peace of an emperor" (Goldsmith 1795, Vol. IV, 154-155) LOUSE - "The antipathies of mankind are various; some considering the toad, some the serpent, some the spider, and some the beetle, with a strong degree of detestation: but while all wonder at the strangeness of each other's aversions, they all seem to unite in their dislike of the louse, and regard it as their natural and most nauseous enemy. Indeed, it seems the enemy of man in the most odious degree; for whatever wretchedness, disease, or hunger seize upon him, the louse seldom fails to add itself to the tribe, and to increase in proportion to the number of his calamities." Cold and lack of moisture will reduce their numbers. "The pthiriasis, or lousy disease, though very little known at present, was frequent enough among the ancients..." "The use of mercury, which was unknown among the ancients, may probably have banished it from among the moderns; for certain it is, that those animals seldom attack any in our climate, but such as from sloth or famine invite their company." (Goldsmith 1795, Vol. IV, 155-158) BUG - "The bug is another of those nauseous insects that intrude upon the retreats of mankind; and that often banish that sleep, which even sorrow and anxiety permitted to approach. This, to many men, is, of all other insects, the most troublesome and obnoxious. The night is usually the season when the wretched have rest from their labour; but this seems the only season when the bug issues from its retreats, to make its depredations. By day it lurks, like a robber, in the most secret parts of the bed; takes the advantage of every chink and cranny to make a secure lodgement, and contrives its habitation with so much art, that scarce any industry can discover its retreat. It seems to avoid the light with great cunning; and even if candles be kept burning, this formidable insect will not issue from its hiding-place. But when darkness permits security, it then issues from every corner of the bed, drops from the tester, crawls from behind the arras, and travels with great assiduity to the unhappy patient, who vainly wishes rest and refreshment. It is generally vain to destroy one only, as there are hundreds more to revenge their companions fate; so that the person who thus is subject to be bitten, remains the whole night like a centinel upon duty, rather watching the approach of fresh invaders, than inviting the pleasing approaches of sleep." "Nor are these insects less disagreeable from their neuseous stench, than their unceasing appetites. When they begin to crawl, the whole bed is infected with the smell; but if they are accidentally killed, then it is unsupportable." Bugs in France and Italy inflict worse and more numerous bites than in Great Britain. Eggs are not affected by fumigation, cold, heat, or moisture can kill them, not even professionals can destroy the eggs very well. Adults killed by fumigations. "even those men who make a livelihood by killing these nauseous insects, though they can answer for the parent, can never be sure of the egg." "The manner of destroying them seems rather the effects of assiduity than antidote; for the men called in upon this occasion, take every part of the furniture asunder, brush every part of it with great assiduity, anoint it with a liquid, which I take to be a solution of corrosive sublimate, and having performed this operation twice or thrice, the vermin are most usually destroyed." "Cleanliness, therefore , seems to be the best antidote to remove these nauseous insects; and wherever this is wanting, their increase seems a just punishment." "Indeed, they are

sometimes found in such numbers among old furniture, and neglected chambers. Exposed to the south, that, wanting other sustenance, they devour each other. They are also enemies to other vermin, and destroy fleas very effectually; so that we seldom have the double persecution of different vermin in the same bed." (Goldsmith 1795, Vol. IV, 161-164)

175. VERMIN - "a collective name, including all kinds of little animals and insects, which are hurtful or troublesome to mankind, beasts, or fruits, &c. As worms, lice fleas, caterpillars, ants, flies, etc." (Dobson 1798, Vol. XVIII, 644) This late eighteenth-century definition of vermin does not include weasels or other larger mammels. However, the late seventeenth-century definition of "vermin" tended to include these larger animals. For example, consider the contents of a 1680 vermin-killer manual, "The Vermin-Killer, being a very necessary Family-Book, containing Exact Rules and Directions for the Artificial killing and destroying of all manner of Vermin, &c. Rats and Mice, Moles, Pismires, Flyes, Fleas & Lice, Snakes, Weasels, Adders, Cattapillars , Buggs, Froggs, &c. Where onto in added the Art of taking of all sorts of Fish and foul, with many observations never before extant." (W.W. 1680, title page)

176. (Blunt 1979, 10) Nicholas Culpeper's The English Physician 1652 was a popular seventeenth-century herbal, and Elizabeth Blackwell's A Curious Herbal maintained a high reputation through the end of the eighteenth century. (Blunt 1979, 182, 176) Also available was a 1695 text which describes Wormwood as useful for, among many other things, "dried and powdered, it defends Cloaths from Moths and Worms." (J.H. 1695, p.WO)

177. (Shteir 1996, 4)

178. (Shteir 1996, 38)

179. Testimony in seventeenth- and eighteenth-century induced abortion cases indicated that some individuals were aware that herbal means of terminating pregnancies existed, but that they were not necessarily familiar with the specifics of these remedies and treatments. (Brown 1996, 240) These cases provide evidence of another example of some of the skills practiced by women with herbs, but also of the dangers in handling these materials, the problems due to accidental ingestion, or the risk of accusations based on purchases or possession of "dangerous" herbs.

180. (Shteir 1996, 39-41)

181. Chapter X "Of The Diseases, and Cures of The Indians" (Beverley 1705, Book III, 52)

182. In 1748 the Virginia Legislature passed a law punishing slaves who used medicines or poisons. (Brown 1996, 354)

183. See (Kerber 1988) for more re: separate spheres.

184.(Boydston 1990, 8) "What is particularly puzzling about these changing attitudes towards women's labor contributions is that they were not paralleled by changes in the work itself." (Boydston 1990, 11) "By the mid-eighteenth century - well before the beginnings of industrialization in North America - the denigration of women's household labor was becoming an established cultural practice for some *women* as well as for men." "The changing perception of housewifery appears to have reflected changes in the larger social and economic context, rather than changes in the nature and economic value of housework itself. A variety of early conditions had created a cultural setting favorable to the recognition of housewifery's economic contribution. More specifically, early conditions had preserved and fostered a cultural context in which women's social subordination did not determine their economic status. As the colonial period wore on, those conditions disappeared. Increasingly, men's claim to social superiority was based on a claim to an exclusively *male* economic agency. In this context, the likelihood that women's domestic labor would be counted on a par with their work of their husbands declined. Many of these changes were material in origin, but the key shifts were ideological. By the eve of their Revolutionary crisis, colonists had largely ceased to *perceive* housewifery as a part of the real economy." (Boydston 1990, 18)

185. (Brown, 1996, 15)

186. "The tangible signs of their success - gardens, land under cultivation, and most important, cities - testified to their identity as Englishmen living during a golden age of English achievement." (Brown 1996, 19)

187. (Brown 1996, 251-261)

188. Yarwood is a notable exception who mentions, briefly, pest control in connection to the history of domestic economy as an aspect of food preservation. (Yarwood 1981, 113) Aries and Duby five volume set of "private life" history includes almost no discussion of cleanliness and, no reference at all to vermin or pest control. (Aries and Duby 1987) This gap in scholarship is even evident among historians, like Hoy, who acknowledge that pests were a problem, but do not consider the issue closely. Hoy reports that even as late as, "Early nineteenth-century Americans, whether on farms or in towns, lived in dirty, buggy, and smelly surroundings." "Although they seemed unbothered by these conditions, travelers from other countries often found them disturbing." (Hoy 1995, 7)

189. (Hectlinger 1977) (Strasser 1982) (Davidson 1982) The single exception to this that I have recovered is the British history of domestic economy by Yarwood. (Yarwood, 1981) The author addresses the issue of the destruction and control of pests in a chapter re: food storage and preservation. "A serious and constant problem was how to keep the various foods secure from pests. In a community which was largely agricultural, its transport and power based on the horse and before days of pesticides, a variety of means of destruction and deterrent were sought and tried out." (Yarwood 1981, 113) Pesticides have existed for centuries. Yarwood's suggestion that they did not exist may be in reference to widely available commercial preparations. Also, in a translation of a fourteenth-century French

text the author has decided to include "sections to which twentieth-century readers - who also have to deal with surly workmen, rid their homes of insects, remove stains from their clothes, cure their family's toothaches, and disguise the taste of their stews when they burn them - can most easily relate." (Bayard 1991, 23) Bayard felt pest control was interesting and important because it resonated with twentieth-century readers, not because of the impact it had on the lives of the fourteenth-century people she discusses.

190. "Our English Hous-wife after her Knowledge of preserving and feeding her Family, must learn also how out of her own indeavours, she ought to cloath them outwardly and inwardly for defence from the cold and comlinesse to the person; and inwardly, for cleanlinesse and neatnesse of the skin whereby it may bee kept from the filth of sweat and vermine; the first consisting of woollen cloth, the latter of linnen." (Markham 1649, 167) (Markham 1986, 146) Also, garden must be carefully tended "...from Birds and other Vermine, which wil otherwise pick the seed out of the earth, and so deceive you of your profit." (Markham 1649, 177) Also, "Sir, I Observed in your Magazine for July, 'An easy method to prevent the increase of bugs,' and was much pleased with the ingenuity of the contriver; but am apt to think the difficulty of procuring the 'glass pedastals' will be, in many cases, insuperable; especially in places a great distance from capital towns. Besides this I have another objection to make against the method proposed which is that it offers only a partiall [sic] remedy. Suppose the increase of bugs is prevented, what are we to do with the capital flock? Not keep then to fatten upon us, I hope; for that I can never consent to: - for my part I am such an enemy to them that I wish to have the whole breed destroyed, and therefore I will tell you how my wife (who is of Low Dutch extraction) keeps my house clear of them. Her method is very easy and simple, and the means she uses may be found in every part of the country, - in short, Sir *'Cleanliness'* in the grand specific; and I beg you will tell all your readers that if they will do as my wife does, that is to say, if they will keep their houses very clean, - take down their bedsteads every spring and fall, and let them be well scalded, - they will never be troubled with bugs." (Americanus, 1775: 361) Also, one old french text regarding women's domestic responsibilities included cleaning and keeping the home and bed free from fleas. (Powers 1928, 173-176)

191. (Davidson 1982, 1)

192. All but pest blurb drawn from (Boydston 1009, xvi) examples of books in question - 1983 Faye E. Dudden Serving Women re: pre-Civil War domestic and paid service, 1982 Laurel Thatcher Ulrich Good Wives, and 1986 Joan M. Jensen Loosening the Bonds.

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# VITA

Megan Haley Newman

Born in Boston, Massachusetts December 5, 1968. Graduated from Notre Dame Academy in Hingham, Massachusetts, May 1986. B.A. Wellesley College, in Wellesley, Massachusetts, 1990. M.A. The College of William and Mary, in Williamsburg, Virginia, 1993 in Anthropology with a concentration in Historical Archaeology.

In September 1992, the author entered the College of William and Mary in Williamsburg, Virginia as a Ph.D. candidate in the American Studies Program.